

Exhibit 4

(Part I of II)

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY**

PPG INDUSTRIES, INC.,

Plaintiff,

v.

UNITED STATES OF AMERICA, et al.,

Defendants.

Civil Action No.

2:12-cv-03526 (JMV)(MAH)

**DECLARATION OF
RANDALL GRIP**

I, Randall Grip, am over the age of 18, and maintain a place of business at 8280 YMCA Plaza Drive Building 11, Baton Rouge, Louisiana. I have personal knowledge of the facts set forth in this declaration, and am fully competent to testify to them if called upon to do so at trial.

1. I am vice-president of Aero-Data Corporation. Aero-Data specializes in aerial mapping and environmental studies using aerial photography and historical maps.

2. I received my Bachelor of Science degree in Geography from Louisiana State University. Over the past 19 years, I have provided expert photo-interpretation and photogrammetry services for environmental assessment purposes.

3. I have been retained by counsel for PPG Industries, Inc. to perform a historical aerial photographic study for the site of a former chrome chemical processing facility on Garfield Avenue in Jersey City, New Jersey.

4. Attached as **Exhibit 110** to the February 28, 2018, Certification of Joseph F. Lagrotteria, Esq., is a true and correct copy of my October 7, 2016 expert report in this matter ("Initial Report"), which contains my findings, conclusions and opinions pertaining to this matter.

5. Attached hereto is a true and correct copy of my January 6, 2017, supplemental and rebuttal report ("Rebuttal Report"), which contains my additional findings, conclusions and opinions pertaining to this matter.

6. My Initial Report and Rebuttal Report provide opinions to which I would testify to in this case, along with an explanation of the bases for them and a statement of the sources and materials upon which I relied. Notwithstanding the foregoing, I reserve the right to supplement my opinions based on any additional documents, testimony or information that is produced in this matter.

7. I declare under the penalty of perjury that my statements, conclusions, and opinions in my Initial Report are true and accurate.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge, information and belief.

A handwritten signature in black ink, appearing to read 'Randall W. Grip', is written over a horizontal line.

Randall W. Grip

DATED: April 17, 2018

EXHIBIT 1

**Production and Interpretation of Aerial Photographs and Maps Covering
the Garfield Avenue Site
in Jersey City, New Jersey**

A handwritten signature in black ink, appearing to read "Randall Grip". The signature is fluid and cursive, with the first name "Randall" and last name "Grip" clearly distinguishable.

Randall Grip

Aero-Data Corporation LLC

October 7, 2016

Introduction

Aero-Data Corporation was engaged by Plaintiff PPG Industries, Inc. to perform an historical aerial photographic study for the site of a former chrome chemical processing facility ("Plant") on Garfield Avenue in Jersey City, New Jersey ("Site"). Specifically, we were asked to obtain aerial photographs from the earliest date available through the mid-1960's and produce imagery for viewing and analysis.

Aerial photography and maps were acquired of the Site from public sources. In addition, I obtained the USGS 7.5 minute scale map and Digital Ortho Quarter Quadrangles (DOQQ) that covered the Site. The vertical photography was then registered to a common coordinate system and interpreted using digital photogrammetric procedures (soft copy).

Statement of Qualifications

My name is Randall W. Grip. I have a Bachelor of Science Degree in Geography from Louisiana State University. I am vice-president of Aero-Data Corporation. Aero-Data specializes in aerial mapping and environmental studies using aerial photography and historical maps. Over the past 19 years, I have provided expert photo-interpretation and photogrammetry services for environmental assessment purposes. In the course of this work, I have participated in studies and obtained and interpreted aerial photographs of sites throughout the United States as well as in other foreign nations.

My expertise is in the area of review and analysis of readily available aerial photography. The processes I use include research and acquisition of stereoscopic photography, high resolution photogrammetric scanning, geo-registration of stereo images, and digital orthophoto production. I have been qualified as an expert witness in the fields of photo-interpretation and photogrammetry.

Aero-Data's client list includes many major corporations as well as government agencies such as the US Department of Justice, the Louisiana Department of Natural Resources, and the Louisiana Department of Environmental Quality.¹

Information Considered in Forming Opinions

My opinions are based upon aerial photography and maps of the Site as well as my experience and training. The maps were geo-referenced to the aerial photography using ArcGIS.

Attachment A is a listing of the aerial photography and other information that I have relied upon for this report.

Production of Geo-Registered Images and Maps

I have produced digital stereoplotter based geo-registered imagery of all of the different dates of aerial photography obtained for this expert report. The imagery, as well as the geo-referenced maps, are included in Attachment B.

Area of Expertise in Which I Expect To Testify

I expect to testify in the areas of photointerpretation and photogrammetry. Photointerpretation is the science of identifying objects in photography and determining their meaning. Photogrammetry is defined as the science of taking measurements from photography. In practical terms, photogrammetry is the science of making maps. My interpretations and opinions outlined in this report are true to a reasonable degree of scientific certainty. Attachment C is my current resume, and Attachment D is a listing of my Trial Testimony,

¹ Exemplar cases include: The United States of America v. 8.34 Acres of Land, and AJL Enterprises, et al., Civil Action No. 04-5-D-M1, U.S. District Court, Middle District of Louisiana; and The Shoshone & Arapaho Indian Tribes of the Wind River Reservation v. The United States of America, Civil Action No. 459a79L U.S.D.C Wyoming

Deposition Testimony, and Publications. My billing rate is \$150 per hour for mapping, report production, and testimony.

Site Area

For the purposes of this report, the Site Area is located on Garfield Avenue in Jersey City, New Jersey. I have superimposed the Site Area on both the Jersey City, NJ 7.5' minute quadrangle and the USGS Digital Ortho Quarter Quad.

Interpretations by Date

1908 Map

This map shows street names, buildings and parcel boundaries. The Site Area, in yellow, has been superimposed over the map. The Site is bounded by Garfield Avenue, Caven Point Avenue, Halladay Street, Forrest Street and the New York Railroad. Hudson Co. Gas Co. is visible on the eastern portion of the Site with two gas holders present. The Morris Canal is visible running southeast to northwest and bisecting the Site.

Commercial Street (southeast of Garfield Ave.), Jane Street, Valley Street, Woodward Street, Van Horne Street and Carteret Avenue are included on this map. By the first date of photography, 4/6/1940, these streets are not present, and buildings and large stockpiles are seen in their place.

May and July 1932 Photos NJDEP

These monoscopic photographs show the conditions of the Site on May and July 1932.

The Site is composed of three main areas being utilized: the Plant buildings, the stockpile area north and south of Carteret Street and the area behind (east) of the Plant containing gas holders and tanks. The main Plant buildings are visible on the northwestern portion of the Site Area.

Carteret Avenue, which was previously visible in the 1908 map is no longer present. The former location has been mapped with a dotted white line. Carteret Avenue divided the Site into a northern and southern portion.

The stockpile areas north and south of the former Carteret Street area are visible but have not been mapped since the imagery is not stereoscopic.

The Morris Canal, which was also visible on the 1908 map, is no longer visible, and its former location is mapped with a dotted black line. A ditch is visible crossing over the former location of the canal in the southern portion of the Site and then travels north along the northwestern side of the stockpiles.

4/6/1940 TXAERO

Two large stockpiles are visible south of the Plant along Halladay Street. Terrain (elevation) Models were generated for these pile areas to determine the approximate volume. The piles were separated into two areas. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **70,716 cubic yards** and the stockpile south of Carteret Avenue is approximately **129,855 cubic yards**. Using my stereoplotter for this and subsequent dates, I have measured the maximum height of each pile relative to a point at the intersection of Halladay Street and Carteret Avenue. I have also measured the approximate maximum length and width of each pile. The north stockpile is **46 feet tall** at its highest point. The south stockpile is **64 feet tall** at its highest point. The north stockpile is **333 feet long** and **237 feet wide**. The overall south stockpile is approximately **594 feet long** and **312 feet wide**.

The gas holders first visible in the 1908 map remain present on the northeastern portion of the Site along Halladay Street. Four smaller tanks are visible to the north of the gas holders.

There are several buildings on the western portion of the Site south of the former Carteret Avenue, but the area is mostly undeveloped.

11/1/1940 NARA

The Plant and gas holders remain present.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **70,991 cubic yards**, and the stockpile south of Carteret Avenue is approximately **146,899 cubic yards**. The north stockpile is **46 feet tall** at its highest point. The south stockpile is **64 feet tall** at its highest point. The north stockpile is **341 feet long** and **219 feet wide**. The south stockpile is split in to two piles, one is **379 feet long** and **263 feet wide**, the other is **202 feet long** and **315 feet wide**.

12/22/1943 and 12/24/1943 NOS

These photomissions are only 2 days apart and the conditions on the Site on both dates are virtually identical.

The plant and gas holders remain present.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **74,204 cubic yards**, and the stockpile south of Carteret Avenue is approximately **179,749 cubic yards**. The north stockpile is **45 feet tall** at its highest point. The south stockpile is **70 feet tall** at its highest point. The north stockpile is **339 feet long** and **232 feet wide**. The south stockpile is **596 feet long** and **306 feet wide**.

7/1/1944 NARA

The Plant and gas holders remain present.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **78,961 cubic yards**, and the stockpile south of Carteret Avenue is approximately **169,740 cubic yards**. The north stockpile is **47 feet tall** at its highest point. The south stockpile is **68 feet tall** at its highest point. The north stockpile is **332 feet long** and **233 feet wide**. The south stockpile is **597 feet long** and **300 feet wide**.

4/28/1947 Robinson

The Plant remains present. A light toned pile is visible on the south portion of the Plant footprint. A terrain model was generated, and the approximate volume of the light toned pile is **5,992 cubic yards**. It is **20 feet tall** at its highest point and measures **219 feet long** and **99 feet wide**.

The gas holders and tanks north of the Gas Holders are no longer present.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **76,307 cubic yards**, and the stockpile south of Carteret Avenue is approximately **199,109 cubic yards**. The north stockpile is **54 feet tall** at its highest point. The south stockpile is **88 feet tall** at its highest point. The north stockpile is **341 feet long** and **239 feet wide**. The south stockpile is **570 feet long** and **307 feet wide**.

A graded area is visible west of the stockpiles along Garfield Avenue. By the next date of photography, eight new buildings/structures are visible in this location. A portion of the ditch southeast of the stockpiles is no longer visible and may have been covered during grading activities.

4/7/1951 TXAERO

The Plant remains present, and the light toned pile remains visible.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **72,989 cubic yards**, and the stockpile south of Carteret Avenue is approximately **202,896 cubic yards**. The north stockpile is **52 feet tall** at its highest point. The south stockpile is **85 feet tall** at its highest point. The north stockpile is **346 feet long** and **233 feet wide**. The south stockpile is **568 feet long** and **296 feet wide**.

Eight rectangular buildings/structures are visible along Garfield Avenue on the former graded area from 4/28/1947. To the south of these buildings, an area of junked vehicles is visible. The junkyard increases in surface area over time.

The ditch south of the former Carteret Avenue is no longer visible and has been covered. The ditch north of the former Carteret Avenue remains present.

6/8/1953 NARA

The Plant remains present, and the light toned pile remains visible.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **67,627 cubic yards**, and the stockpile south of Carteret Avenue is approximately **161,641 cubic yards**. The north stockpile is **39 feet tall** at its highest point. The south stockpile is **69 feet tall** at its highest point. The north stockpile is **344 feet long** and **234 feet wide**. The south stockpile is **535 feet long** and **271 feet wide**.

12/5/1953 Intrasearch

The Plant remains present, and the light toned pile remains visible. A terrain model was generated of the light toned pile, and the approximate volume of the light toned pile is **4,563 cubic yards**. It is **20 feet** tall at its highest point and measures **155 feet long** and **78 feet wide**.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **73,505 cubic yards**, and the stockpile south of Carteret Avenue is **154,131 cubic yards**. The north stockpile is **43 feet tall** at its highest point. The south stockpile is **61 feet tall** at its highest point. The north stockpile is **349 feet long** and **239 feet wide**. The south stockpile is **531 feet long** and **257 feet wide**.

1/4/1954 USGS

The Plant remains present, and the light toned pile remains visible.

The stockpiles remain visible, and terrain models were generated for these pile areas to determine the approximate volume. The stockpile north of Carteret Avenue is mapped and calculated to be approximately **73,282 cubic yards**, and the stockpile south of Carteret Avenue is **149,395 cubic yards**. The north stockpile is **43 feet tall** at its highest point. The south stockpile is **61 feet tall** at its highest point. The north stockpile is **340 feet long** and **233 feet wide**. The south stockpile is **504 feet long** and **253 feet wide**.

2/18/1954 USGS

The Plant remains present.

The stockpiles both north and south of Carteret Avenue are visible. Since the condition of the two stockpiles is virtually identical to their 1/4/1954 conditions, a terrain model was not produced.

5/24/1958 COLEAST

The Plant remains present. The light toned pile is no longer visible.

Carteret Avenue has been mapped and is present bisecting the Site. The stockpiles both north and south of Carteret Avenue are no longer visible. To the north of Carteret Avenue, smaller piles of material are visible within and north of the former stockpile footprint.

The ditch remains visible north of the former location of Carteret Avenue, and additional drainage features are visible southeast of the Plant.

4/16/1959 Robinson

The Plant remains present with piles of material visible. Carteret Avenue has been mapped and is present bisecting the Site. Southeast of the Plant, a small pile has been added and two removed north of Carteret Avenue.

4/12/1961 Aerial Viewpoint

The Plant remains present with piles of material visible. Smaller piles of material southeast of the Plant remain visible with additional small piles added since the previous date of photography.

5/7/1962 Intrasearch

The Plant remains present with piles of material visible. Smaller piles of material southeast of the Plant remain visible, and several areas of pile removal are seen since the previous date of photography.

11/12/1962 NOS

The Plant remains present with piles of material visible. Smaller piles of material southeast of the Plant remain visible. There are no significant changes since the previous date of photography.

1/4/1963 Robinson

The Plant remains present with piles of material visible. Smaller piles of material southeast of the Plant remain visible and one area of pile removal is visible since the previous date of photography.

6/20/1966 NOS

The buildings, tanks and piles associated with the Plant have been removed.

The piles of material southeast of the Plant are no longer visible. The ditch remains present southeast of the former Plant buildings.

3/18/2007 USGS

The 2007 aerial photo was downloaded as a geo-registered orthophoto. The Site Area, in yellow, has been superimposed over the image and the main roads labeled.

Historical Oblique Aerial Photos

Oblique 102922, 102931B

This is an image taken after 4/28/1947 from the southeast looking northwest. The image shows the Plant buildings and the stockpiles along Halladay Street.

Oblique 103164, 103165

This is an image taken after 4/28/1947 from the east looking west. The image shows the Plant buildings and the stockpiles along Halladay Street.

Oblique 103173

This is an image taken after 4/28/1947 from the west looking east. The image shows the Plant buildings and the stockpiles along Halladay Street.

Oblique 103180B, 103181

This is an image taken after 4/28/1947 from the east looking west. The image shows the Plant buildings and the stockpiles along Halladay Street.

Stockpile Terrain Model Oblique Views

The terrain models are a 3D representation of the surface. The terrain modeling was produced using the following 10 dates of photography: 4/6/1940, 11/1/1940, 12/22/1943, 12/24/1943, 7/1/1944, 4/28/1947, 4/7/1951, 6/8/1953, 12/5/1953, and 1/4/1954. Once imported into the GIS, the software could change the display of the terrain model to an oblique angle and allow the user to tip and rotate the elevation model for a better understanding of the Site's topography.

Images from the oblique views of each of the 10 dates were produced from the same perspective and scale. A set of images has been produced of the Site from the north looking towards the south. Each has been printed and is included in this report.

Anaglyph Images

For stereo viewing of the aerial images while reading this report, anaglyph (3-D) images were produced by the digital stereoplotter from the stereomodels. The anaglyph is produced by merging the two overlapping stereo images into a composite digital image with the left frame colored red and the right frame colored blue.

By viewing the anaglyph image through red and blue glasses, the composite image is separated into two slightly different images, one for each eye. This allows a reader with normal stereovision to perceive a stereo (or 3-D) view of the Site.

Anaglyph images are produced using a stereo pair of successive photos along a flight line. The image orientation is dependent on the direction of the flight line. For example, north-south flight lines will have an anaglyph with west orientated to the top. East-west flight lines will have an anaglyph with north oriented to the top.

Anaglyph images were produced from the following 18 dates of photography and are included as exhibits in this report: 4/6/1940, 11/1/1940, 12/22/1943, 12/24/1943, 7/1/1944, 4/28/1947, 4/7/1951, 6/8/1953, 12/5/1953, 1/4/1954, 2/18/1954, 5/24/1958, 4/16/1959, 4/12/1961, 5/7/1962, 11/12/1962, 1/14/1963, and 6/20/1966.

Control Points and Check Points

The control points used to setup the stereomodels have been superimposed over the LiDAR Terrain and the 2007 imagery.

The terrain modeling was produced using 10 dates of photography taken at different altitudes. We have compiled elevation check points both on and offsite to confirm the reasonable accuracy of each of the dates to the initial ground control from the LiDAR data. The check points, 22 total, used to verify the accuracy have been superimposed over the 2007 imagery. The building heights measured with the stereo plotter were confirmed using LiDAR terrain model.

Methods and Materials

Aerial research and acquisition

The historical aerial photography study of the Site began with research for available photo coverage from public and private vendors. The photo coverage was then obtained in the form of frames consisting of vertical stereoscopic photography in a 9"x9" format and/or orthophotos.

Initial review and date verification

The frame or scan for each photomission (date of photography) was reviewed and examined for proper geographic coverage of the Site and filed into separate folders for each photomission.

Setting up the stereomodels

Two or more raster images for each stereo date of photography were then imported into a digital stereoplotter capable of providing stereoscopic viewing of the images at magnification levels ranging from 1x to 128x. The digital stereoplotter also allows precise mapping of significant environmental features, which are interpreted, in the 3-D imagery.

Ground control (State Plane New Jersey Zone NAD83) for the initial stereomodel, 6/20/1966, was derived from the 3/18/2007 USGS imagery and the Lidar terrain model.

The coordinates of each selected visible ground control point were then entered into a control point file in the digital stereoplotter. The floating dot (measuring point) of the stereoplotter was carefully positioned by the operator with the hand controller, one point at a time, onto each of the visible control points and the coordinates of that point (from the ground control point file) were assigned to the image. When sufficient control points had been visited, accepted and the model checked for residual errors, the stereo model was then confirmed to be level, scaled and locked into the coordinate system. As a result, accurate measurements of heights and distances could now be made within the stereo model area by using the digital stereoplotter.

Other stereo models for the remaining dates of photography were then set up using ground control points derived from the initial stereo model. As a result the stereo models for all dates accurately register one to another allowing the photo interpreter to detect and map changed areas.

Digital Ortho Production

Next, using the stereomodels and digital stereoplotter, a digital orthophoto was produced for each date of photography. A digital orthophoto is a two dimensional raster image produced from one or more frames of vertical aerial photography such that most of the distortion caused by terrain displacement and tip and tilt in the mapping camera has been removed, and the resulting raster image is accurately registered to a chosen coordinate system. As a result, each digital orthophoto accurately depicts the roads, building bases and other significant features located within the Site in their true geographic position. However, distortion caused by the height of buildings was not removed. As a result, the bases of these structures are displayed in their true position, while their tops may be displaced.

Digital orthophotos are widely accepted today by both government and industry as an improvement over the base maps and photomosaics previously used to show the locations of features within a geographic area. Digital orthophotos have the accuracy of a stereoplotter or land survey produced map with the resolution of a photograph.

Photointerpretation

Photointerpretation of the Site was conducted primarily on the digital stereoplotter using the same digital stereo models used to produce the digital orthophotos. The digital stereoplotter allows me to view the Site in 3-D on a stereo computer monitor or large computer projection screen, normally at magnification factors ranging from 8X to 32X while identifying and mapping the outlines of features.

When necessary to map very small features, I could zoom to magnification factors as high as 128X. Generally speaking, zoom settings greater than 32X do not yield more detail, but they do help in carefully mapping small features.

The interpretation done with the digital stereoplotter captured all features in their true position. Stereo

models for different dates were viewed and rapidly (in one to two seconds) toggled back and forth on the stereo display to facilitate the detection of changes that occurred to the Site over time. Each class of significant features mapped was recorded on a separate layer and color-coded. The vector files and images were then exported from the digital stereo plotter to a computer for further use. The digital stereoplotter (soft copy) when used in this manner is an extremely powerful photointerpretation tool. I understand that soft copy was originally developed for the military for photointerpretation purposes. Current development of the technology is ongoing. The cost of development is supported by various military and intelligence gathering organizations, NASA and conventional mapping companies similar to my own.

Topographic Mapping/Terrain Model Production

Topographic mapping involves the mapping of surface elevations. Topographic mapping traditionally uses contour lines and spot elevations to portray the shape and elevation of the land. Topographic maps render the three-dimensional ups and downs of the terrain on a two-dimensional surface.

The topography of a surface can also be represented with terrain modeling using a TIN (Triangulated Irregular Network). Using the stereomodels, the operator uses the hand controller to manually measure points on the land surface. The result is a TIN which is a vector based model representation of the physical land surface using a set of contiguous, non-overlapping triangles. Within each triangle, the surface is represented by a plane.

Volume calculations

The TINs were then imported into ArcGIS 3-D Analyst, a volume calculating software package. The software then compared the TIN to the base surface (elevation) to determine the volume of the material piles.

The software could also change the display of the TIN to an oblique angle and allow the user to tip and rotate the elevation model for a better understanding of the Site's topography.

ArcView GIS

The digital orthophotos with the interpretation overlays were next imported into ArcView GIS. ArcView is a very popular geographic information system (GIS) produced by ESRI and sold throughout the world. For the purposes of this report, the interpreted images are referred to as "mapped images". Hard copies of the mapped images were then printed in an 8.5"x11" or larger format from a PC using a high-resolution printer.

The interpreted images and registered maps located in the interpretations section of this report contain specific information and opinions which must be viewed by the reader in order to fully understand this report. These opinions supplement the textual opinions identified in my report. The mapped images (Attachment B) constitute the primary source of information in this report. They were prepared so that they may be displayed using computer generated prints or a computer projection system running ArcView or other software. ArcView GIS provides a wide range of capabilities such as zooming, turning themes (layers) on and off and measuring distances. Interpreted images and maps will be used as exhibits at trial in my testimony. There may be additional demonstrative exhibits used at trial as well.

Conclusion

Given that the parties are simultaneously serving expert reports in this matter, and the Court's scheduling permitting rebuttal reports, I reserve the right to revise and supplement this report, including but not limited to the volumetric calculations set forth within.

Attachment A**Information Relied Upon**

<i>City</i>	<i>State</i>	<i>Date</i>	<i>Ratio</i>	<i>Type</i>	<i>Source</i>	<i>Frames and Notes</i>	<i>Focal length</i>
Jersey City	NJ	1/1/1908		MAP	NYPLDC/HOPKINS		
Jersey City	NJ	1/1/1932		B/W	NJDEP	5/1932 and 7/1932	
Jersey City	NJ	4/6/1940	20000	BW	Aerial Viewpoint/TXAERO	111, 112	
Jersey City	NJ	4/6/1940	20000	BW	Aerial Viewpoint/TXAERO	192, 193	
Jersey City	NJ	11/1/1940	24000	BW	NARA	649-651	
Jersey City	NJ	12/22/1943	20000	BW	NOS	255, 256	
Jersey City	NJ	12/24/1943	20000	BW	NOS	398, 399	
Jersey City	NJ	7/1/1944	10000	BW	NARA	11, 12	
Jersey City	NJ	4/28/1947	12000	BW	ROBINSON	277, 278	8.25in.
Jersey City	NJ	4/7/1951	20000	BW	Aerial Viewpoint/TXAERO	2752, 2753	152.75mm
Jersey City	NJ	6/8/1953	24000	BW	NARA	79, 80	152.32mm
Jersey City	NJ	12/5/1953	20000	BW	INTRASEARCH	37, 38	
Jersey City	NJ	12/5/1953	20000	BW	INTRASEARCH	97, 98	
Jersey City	NJ	1/4/1954	20000	BW	USGS	58,59	153.22mm
Jersey City	NJ	2/18/1954	20000	BW	USGS	88, 89, 90	154.82mm
Jersey City	NJ	1/1/1967	24000	Map	USGS	Jersey City, Ny- NJ 7.5 Minute DRG REVISED 1981	
Jersey City	NJ	5/24/1958	19726	BW	COL-EAST	7, 8	
Jersey City	NJ	4/16/1959	18000	BW	ROBINSON	6, 7	210mm
Jersey City	NJ	4/12/1961	18000	BW	Aerial Viewpoint/TXAERO	232, 233	152.22mm
Jersey City	NJ	4/12/1961	36000	BW	NOS	5691, 5692	153.02mm
Jersey City	NJ	5/7/1962	12000	BW	INTRASEARCH	161, 162	152.77mm
Jersey City	NJ	11/12/1962	30000	BW	NOS	2300A, 2301A	153.02mm
Jersey City	NJ	1/14/1963	14400	BW	ROBINSON	63, 64	
Jersey City	NJ	6/20/1966	30000	BW	NOS	9001, 9002	152.29mm
Jersey City	NJ	3/29/1995		DOQQ	USGS	Jersey City NJ NW and NE DOQQ	
Jersey City	NJ	3/18/2007		COL	USGS	Orthophotos	
Jersey City	NJ	2014 Post Sandy		Lidar	NOAA/USGS		
Jersey City	NJ			BW	Fairchild	Fairchild Oblique Images	

Attachment B

Site Area



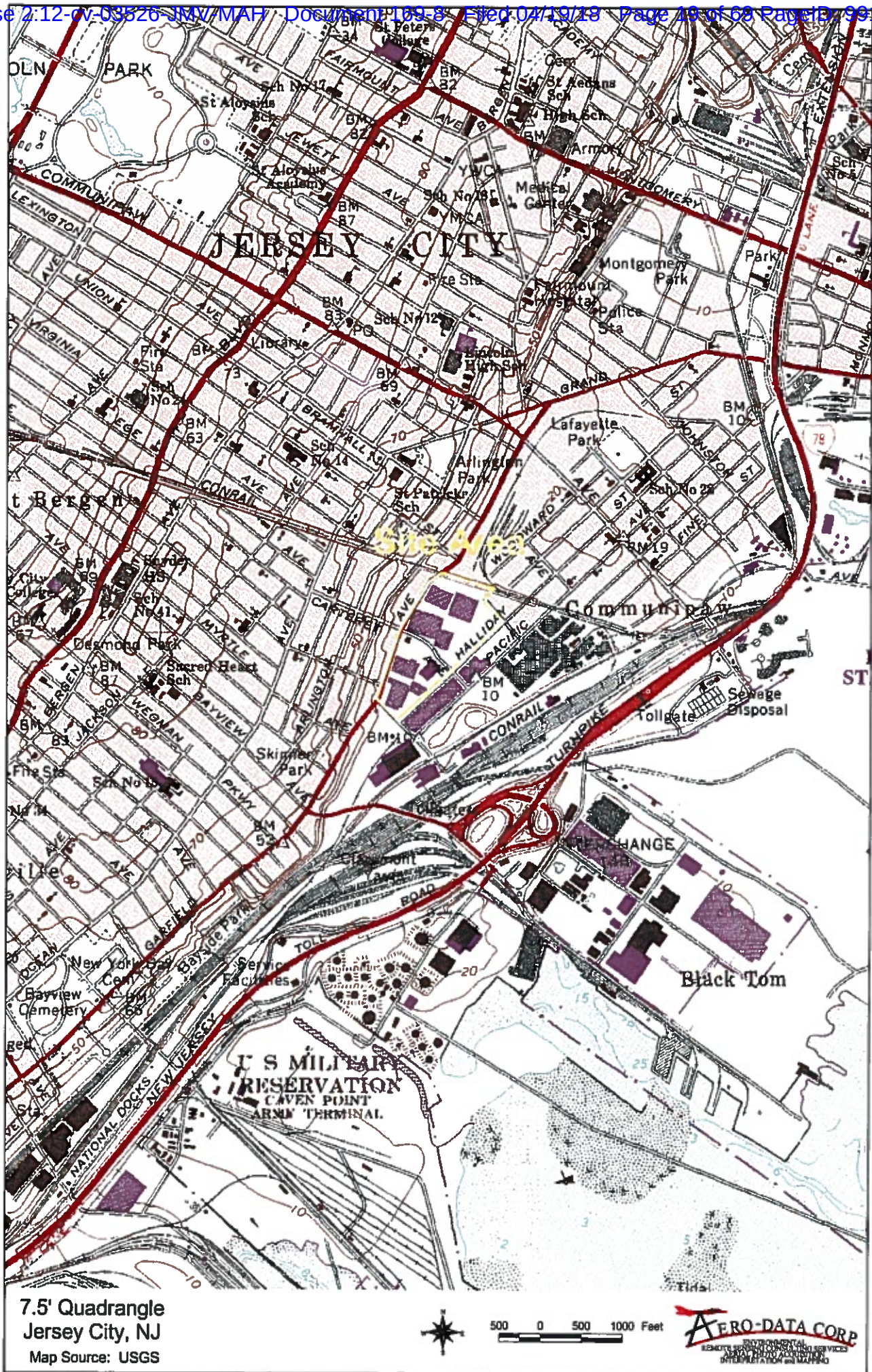
DOQQ
Jersey City, NJ
Photo Source: USGS

Jersey City, NJ DOQQ
4/8/1994 (NE) and
3/29/1995 (NW)



500 0 500 1000 Feet





Orthophotos and Maps

 **Site Area**

80 0 80 160 Feet





May 1932
Jersey City, NJ
Photo Source: NJDEP by Opposition

- Pile Area Volume
- Site Area
- Tanks
- Structure

Legend

- Road
- Railroad
- Fence
- Drainage/Water
- Buildings

Former Carteret Ave. and Former Morris Canal from 1906 NYPL Map

Underlying Image
USNPR0013839



80 0 80 160 Feet





July 1932
Jersey City, NJ

Photo Source: NJDEP by Opposition

Legend

- | | |
|---|--|
| Mapped Piles |  Road |
| ● Labels |  Railroad |
| Pile Area Volume |  Fence |
| Site Area |  Drainage/Water |
| Tanks |  Buildings |
|  Structure | |

Former Carteret Ave. and Former Morris Canal from 1906 NYPL Map

Underlying Image
USNPR0013593



80 0 80 160 Feet





4/6/1940
Jersey City, NJ
Photo Source: Aerial Viewpoint

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

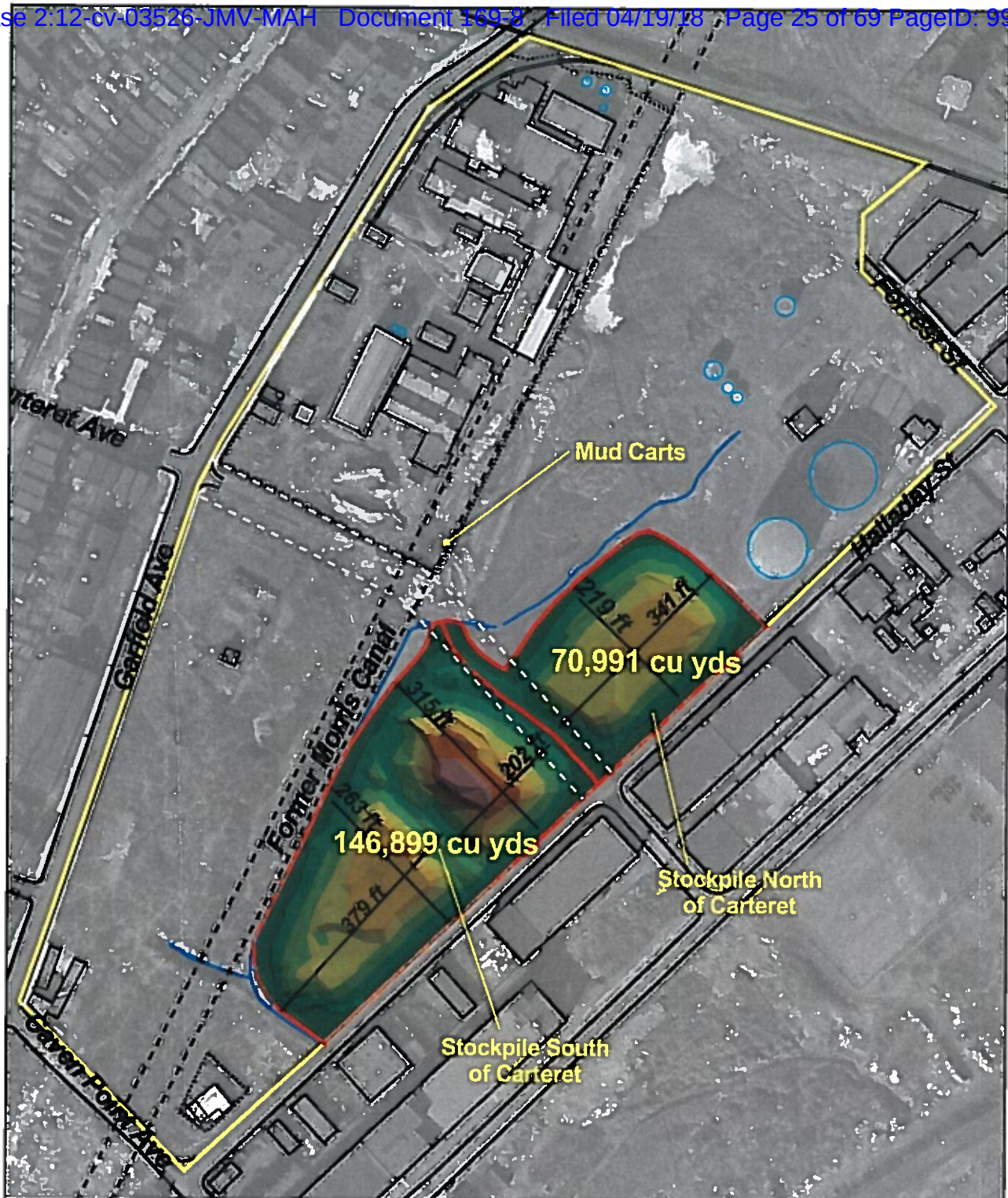
Former Carteret Ave. and Former Morris Canal from 1908 NYPL Map

Underlying Image
PPGNPR0024485
PPGNPR0314365-380



80 0 80 160 Feet





11/1/1940
Jersey City, NJ
Photo Source: NARA

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

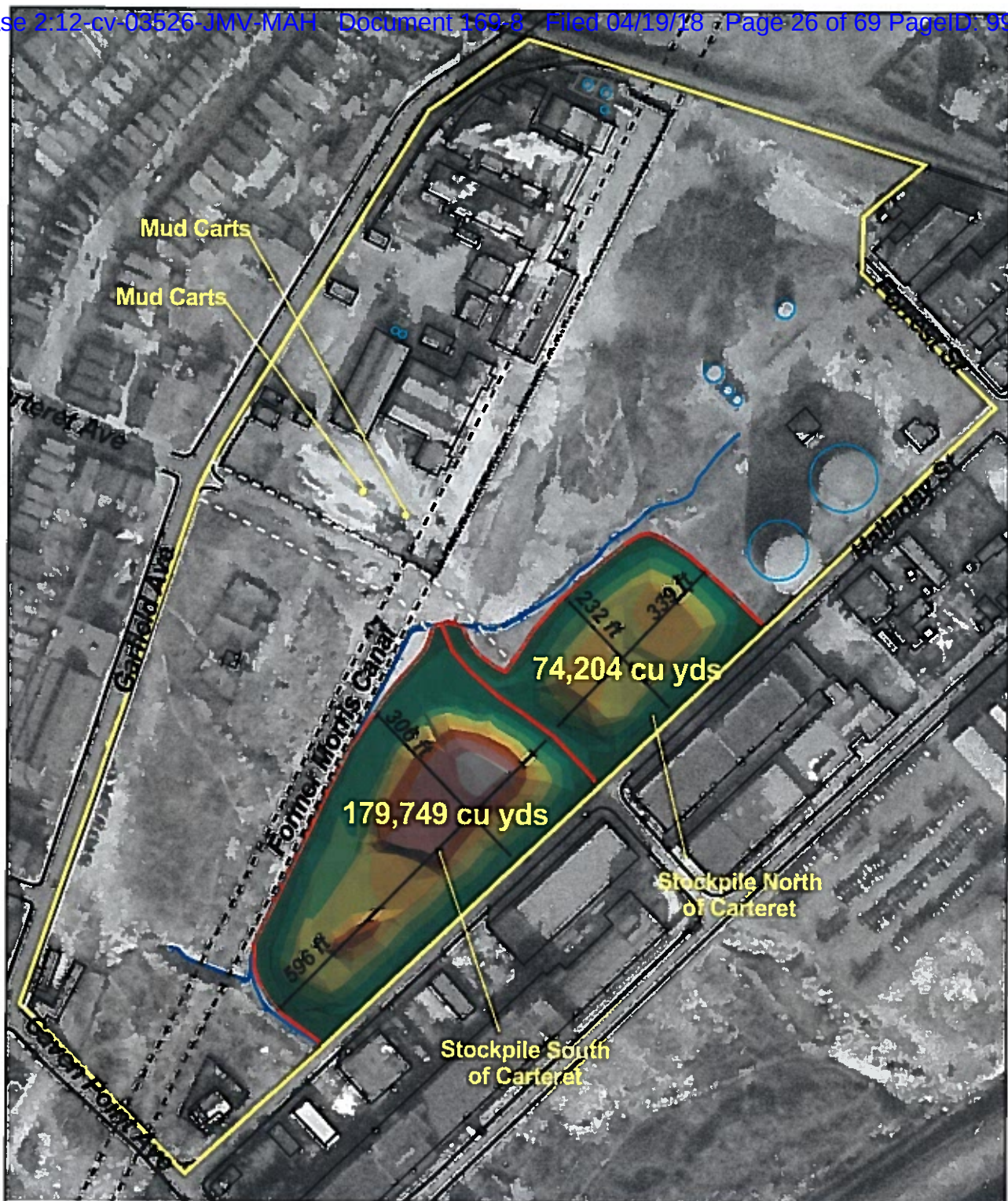
	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR0314365-380



80 0 80 160 Feet

AERO-DATA CORP
REMOTE SENSING AND SERVICES
AERIAL PHOTO ACQUISITION
INTERPRETATION AND ANALYSIS



12/22/1943
Jersey City, NJ
Photo Source: NOS

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

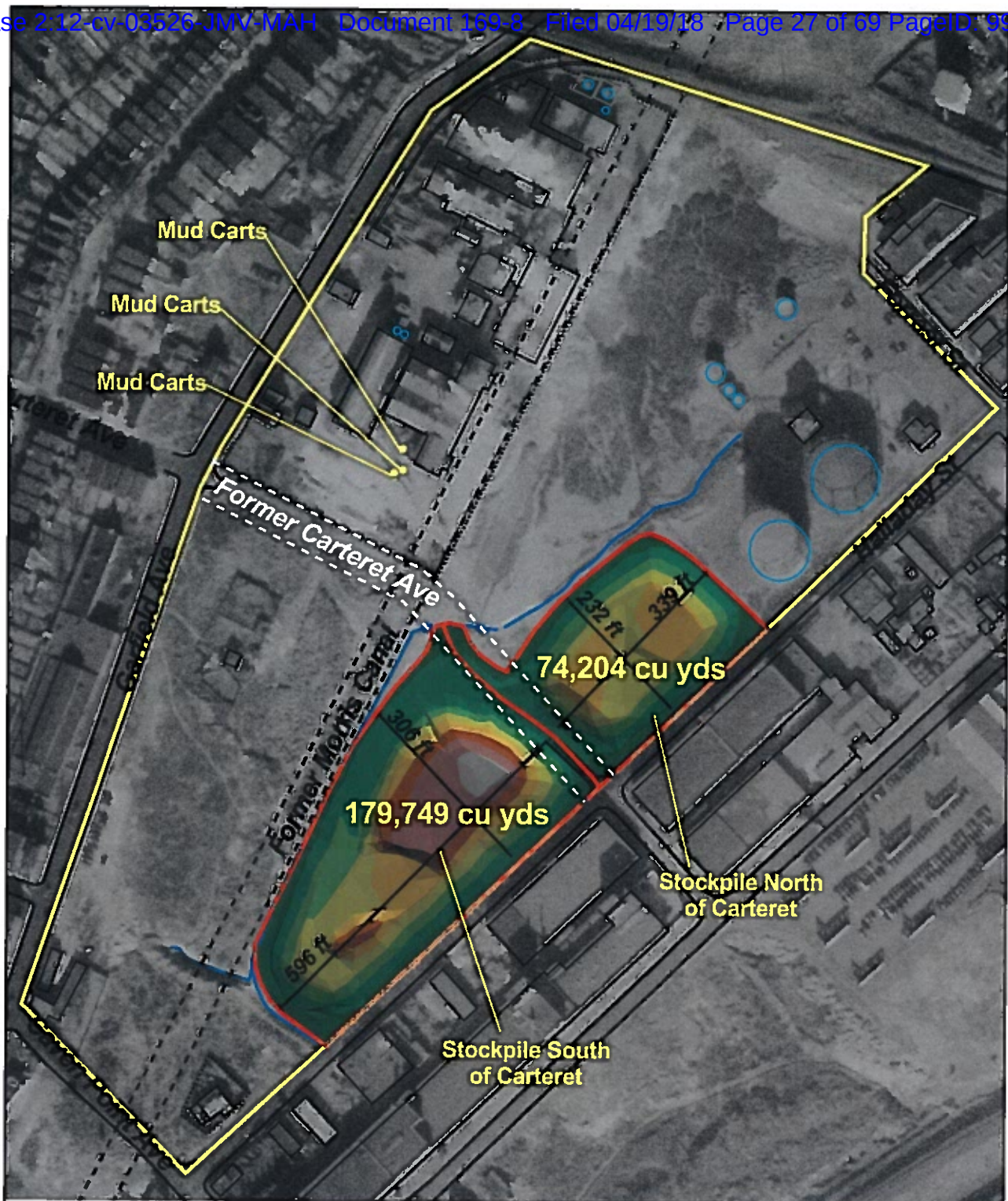
All Mapping Completed with 12/24/1943 imagery

Underlying Image
PPGNPR0048094-112
PPGNPR0782415-432



80 0 80 160 Feet

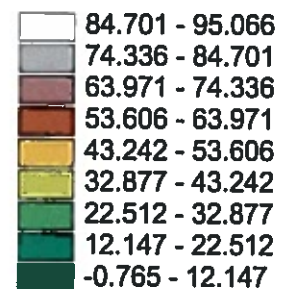




12/24/1943
Jersey City, NJ
Photo Source: NOS



**Pile Terrain Model
Elevation Range (Feet)**

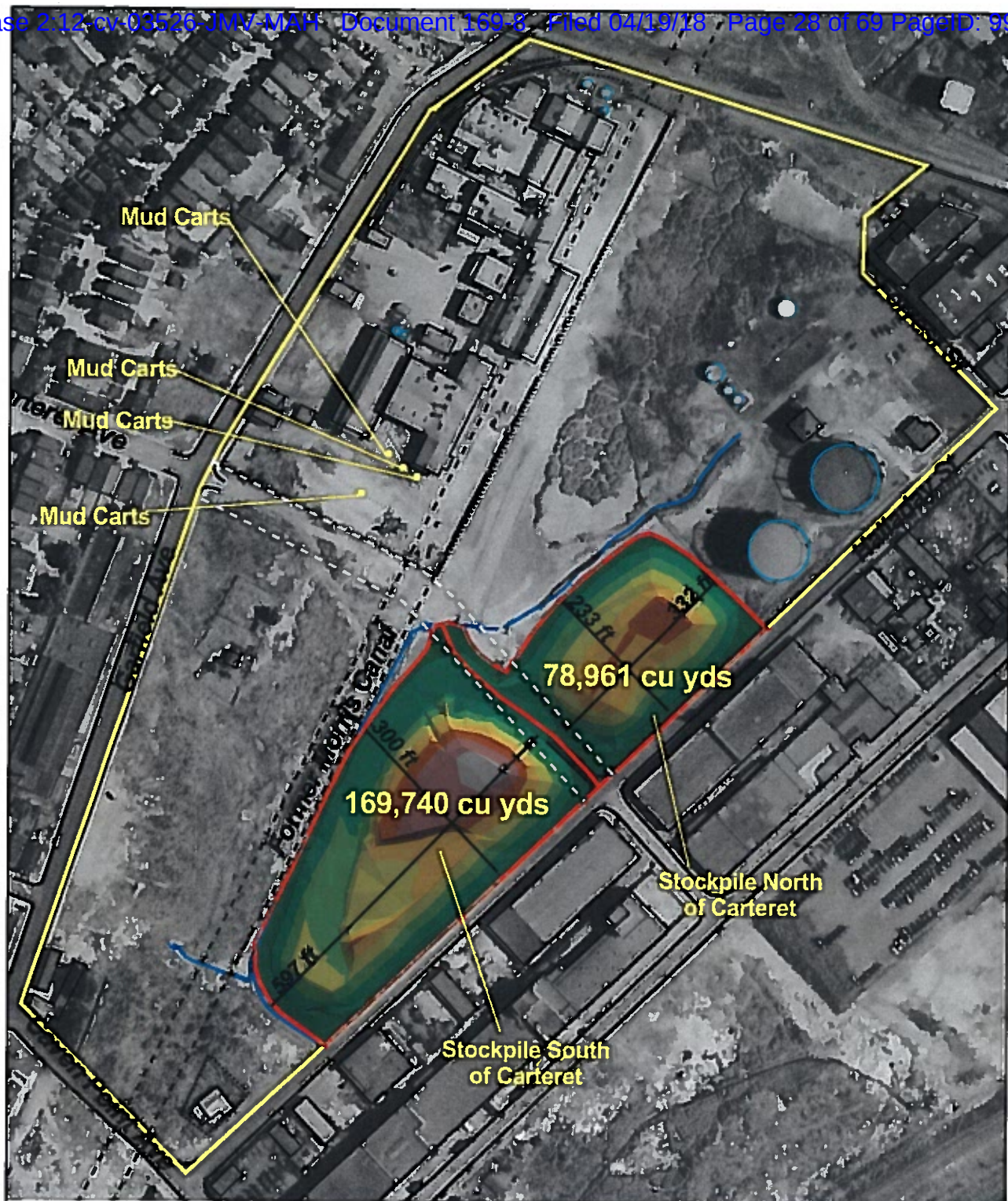


Underlying Image
PPGNPR00448094-112



80 0 80 160 Feet





7/1/1944
Jersey City, NJ
Photo Source: NARA

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

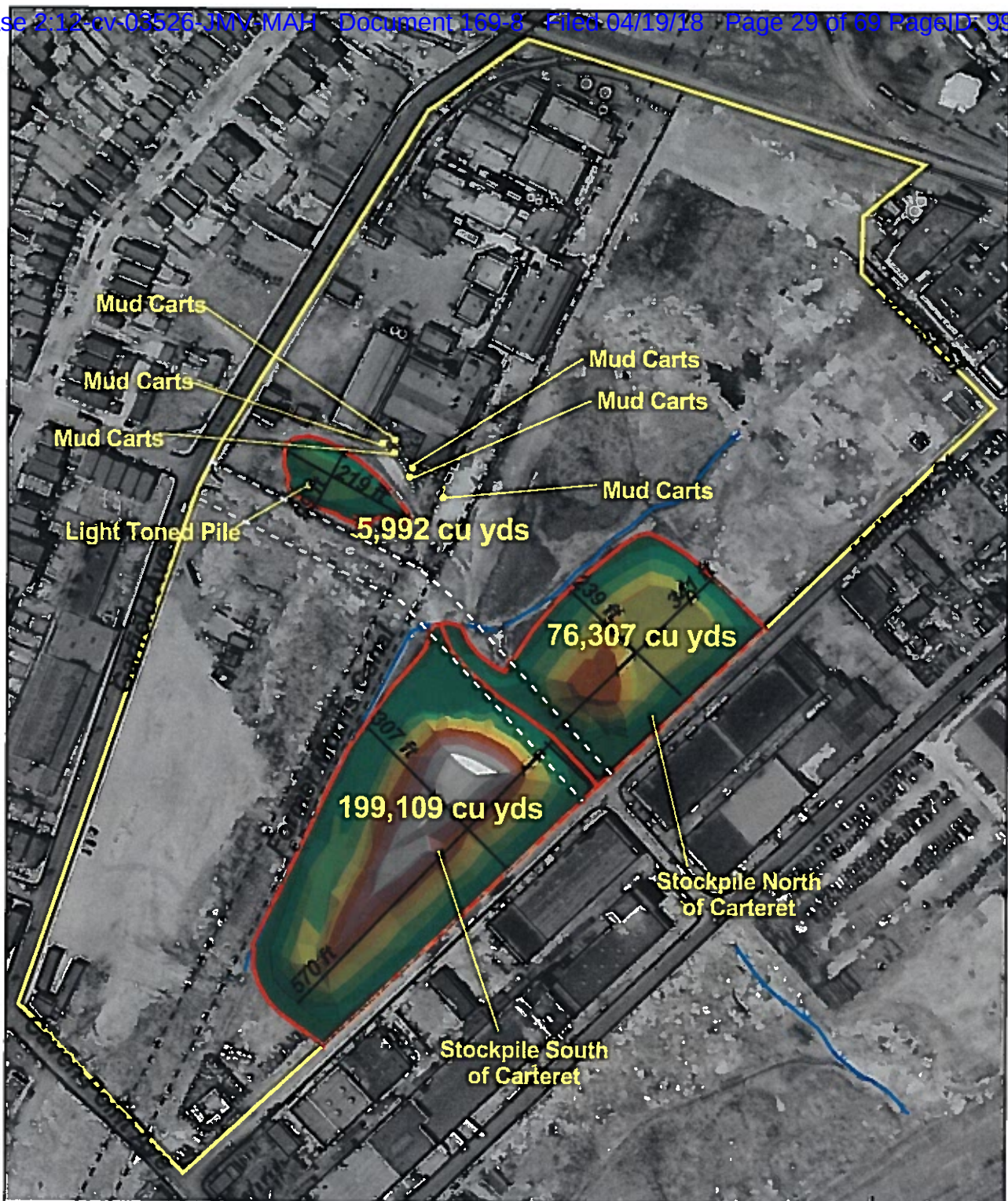
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	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR00448094-112



80 0 80 160 Feet





4/28/1947
Jersey City, NJ
Photo Source: Robinson

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

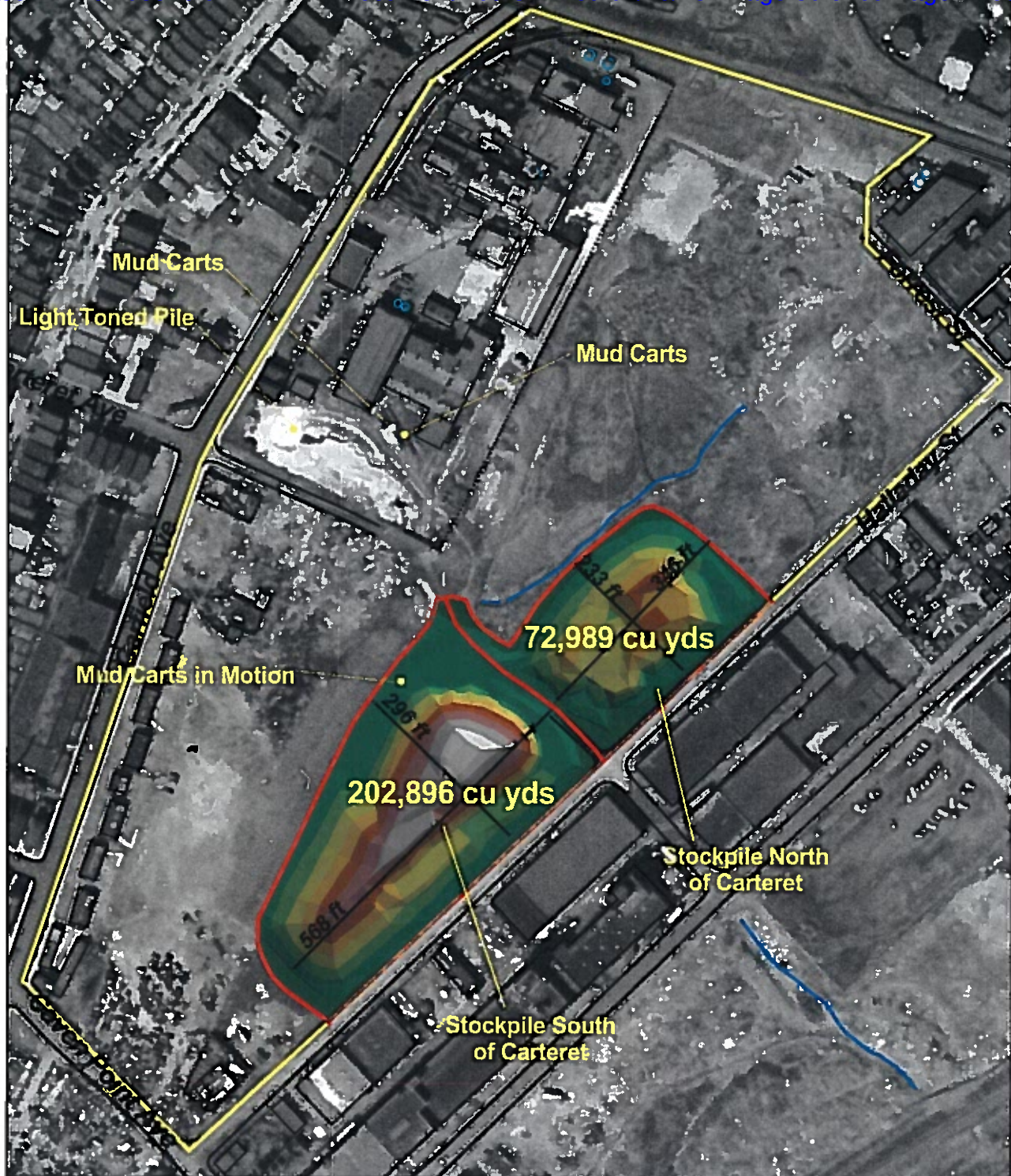
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	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
USNPR0013843



80 0 80 160 Feet

AERO-DATA CORP.
REMOTE SENSING SERVICES
INTERPRETATION & REPORTING



4/7/1951
Jersey City, NJ
Photo Source: Aerial Viewpoint

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

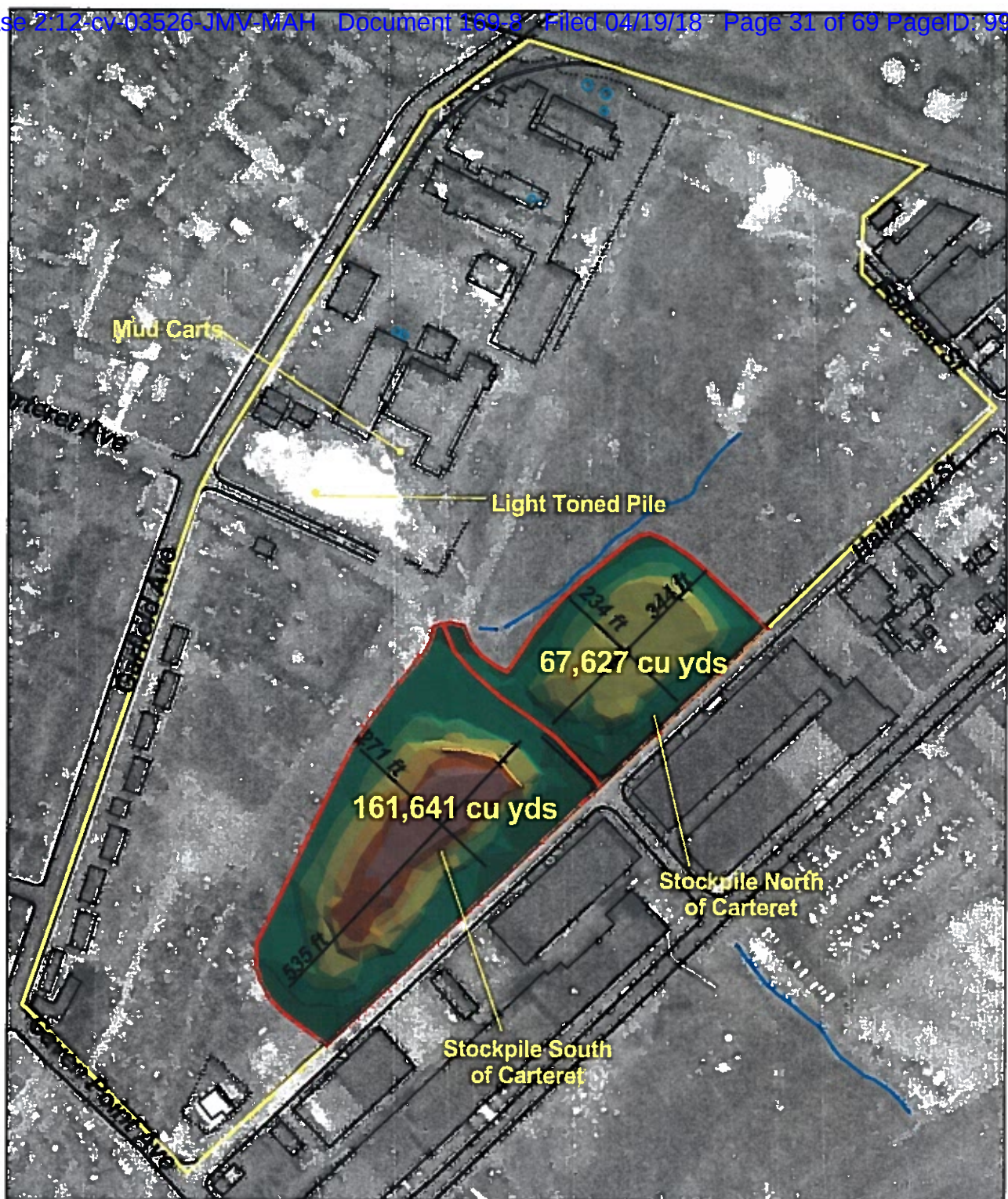
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	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR0024486
PPGNPR0314365-380



80 0 80 160 Feet





6/8/1953
Jersey City, NJ
Photo Source: NARA

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR1060693-976



80 0 80 160 Feet





12/5/1953
Jersey City, NJ
Photo Source: Intrasearch

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

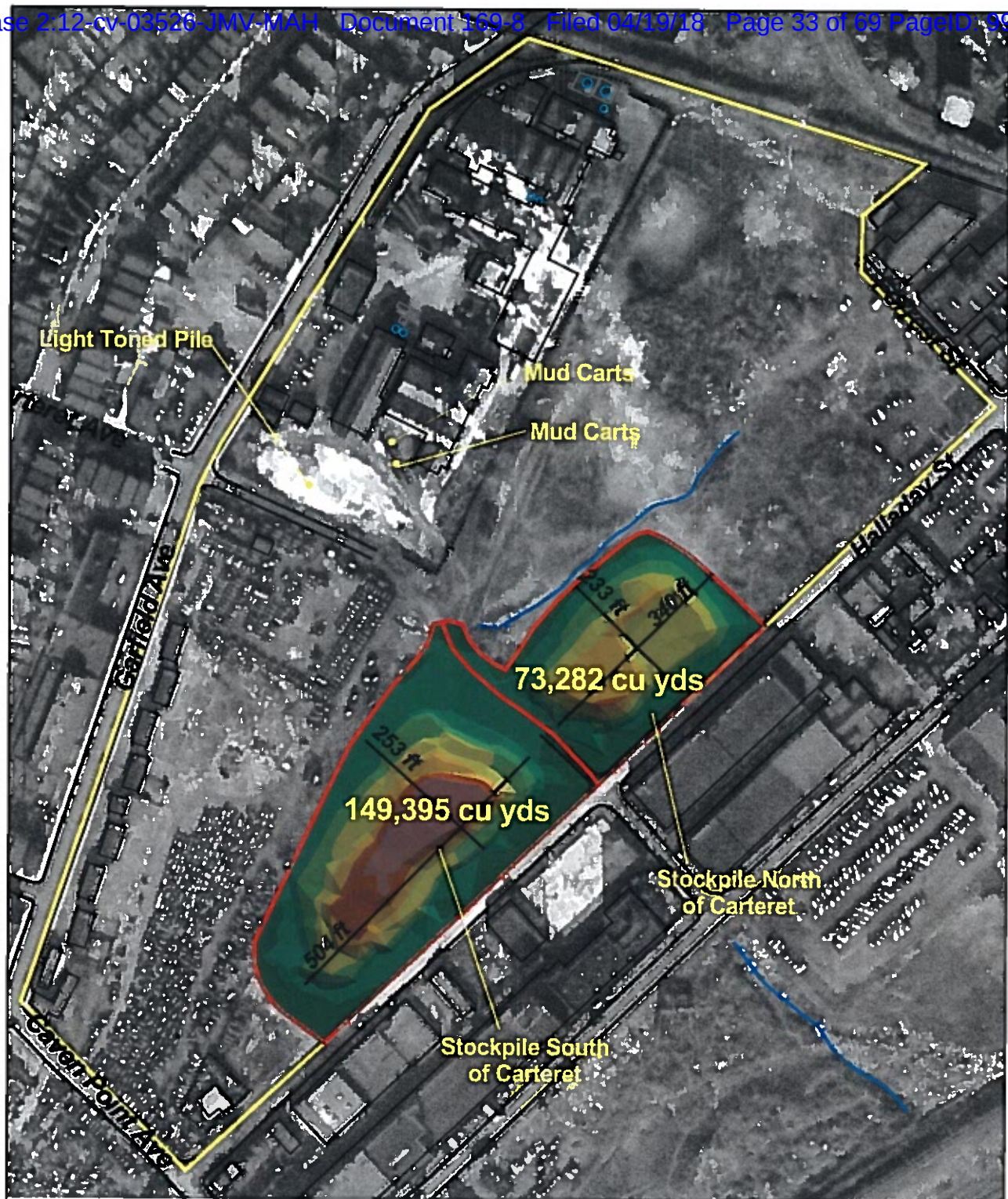
	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR1060693-976
PPGNPR00448094-112



80 0 80 160 Feet





1/4/1954
Jersey City, NJ
Photo Source: USGS

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

	84.701 - 95.066
	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
USNPR0013846



80 0 80 160 Feet





2/18/1954
Jersey City, NJ
Photo Source: USGS

- Legend**
- Pile Area Volume
 - Site Area
 - Tanks
 - Structures
 - Road
 - Railroad
 - Fence
 - Drainage/Water

**Pile Terrain Model
Elevation Range (Feet)**

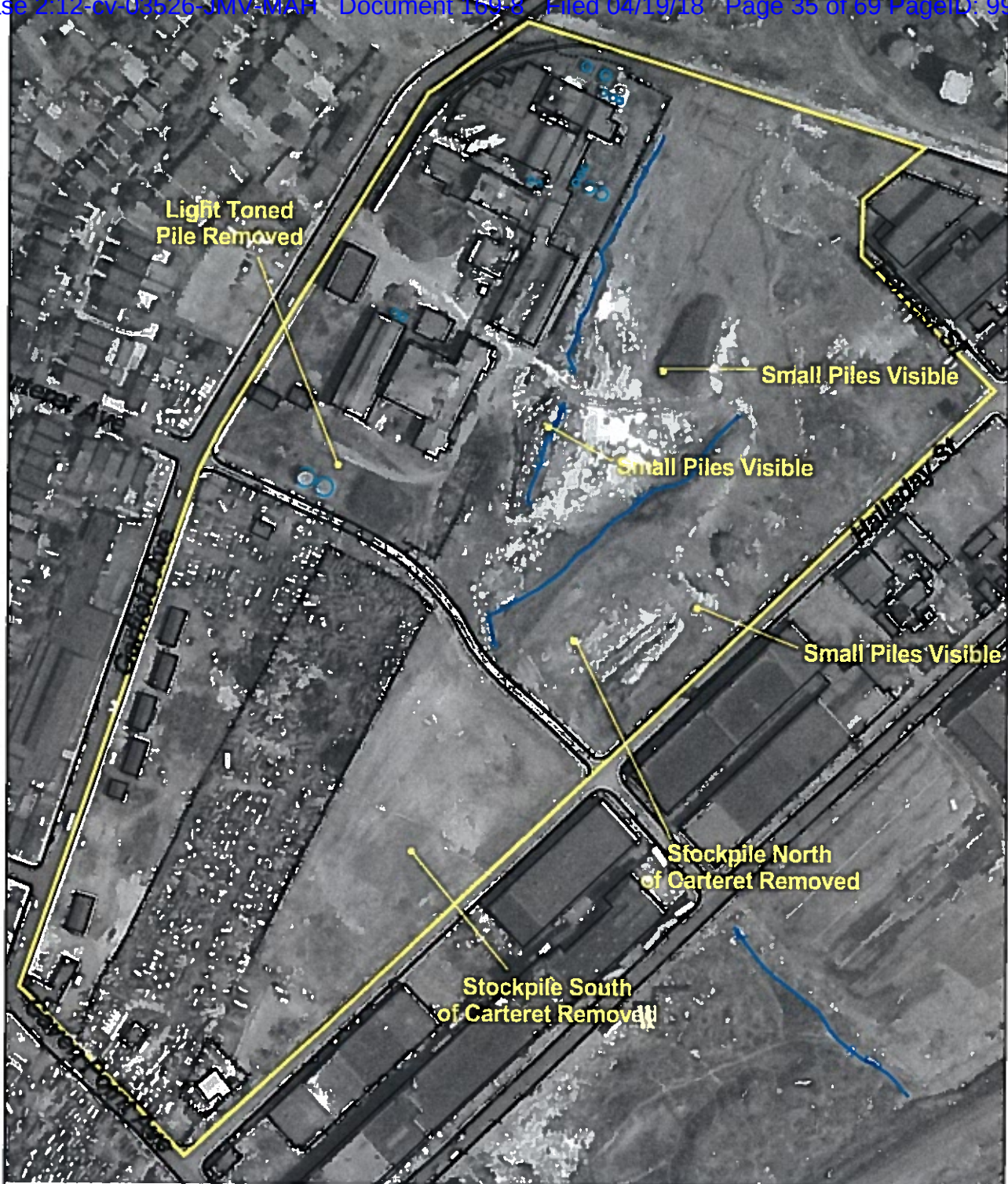
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	74.336 - 84.701
	63.971 - 74.336
	53.606 - 63.971
	43.242 - 53.606
	32.877 - 43.242
	22.512 - 32.877
	12.147 - 22.512
	-0.765 - 12.147

Underlying Image
PPGNPR1060693-976



80 0 80 160 Feet





5/24/1958
Jersey City, NJ
Photo Source: COLEAST

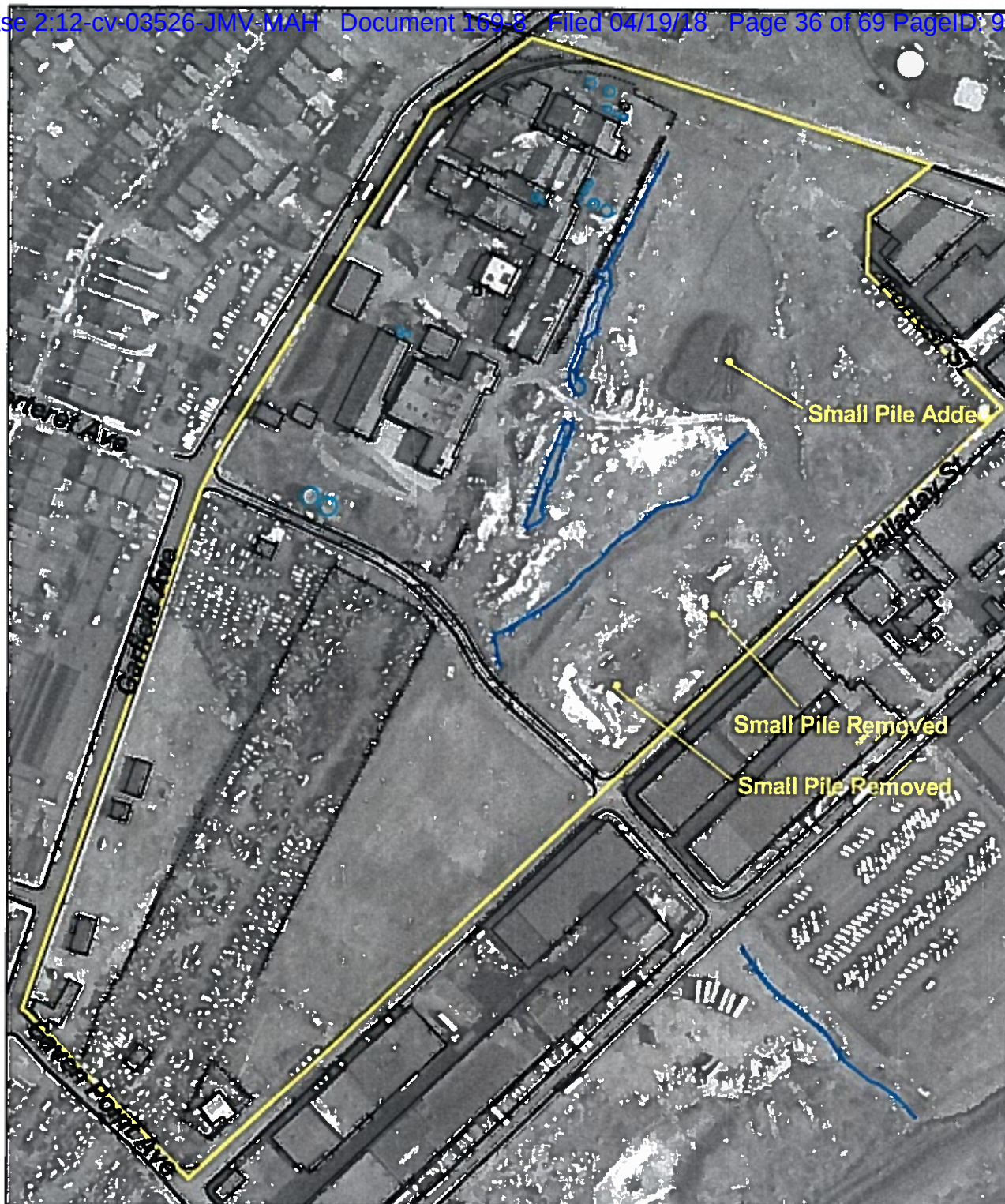
- Legend**
- | | |
|--|--|
|  Pile Area Volume |  Road |
|  Site Area |  Railroad |
|  Tanks |  Fence |
|  Structures |  Drainage/Water |

Underlying Image
PPGNPR1060693-976



80 0 80 160 Feet





4/16/1959
Jersey City, NJ
Photo Source: Robinson

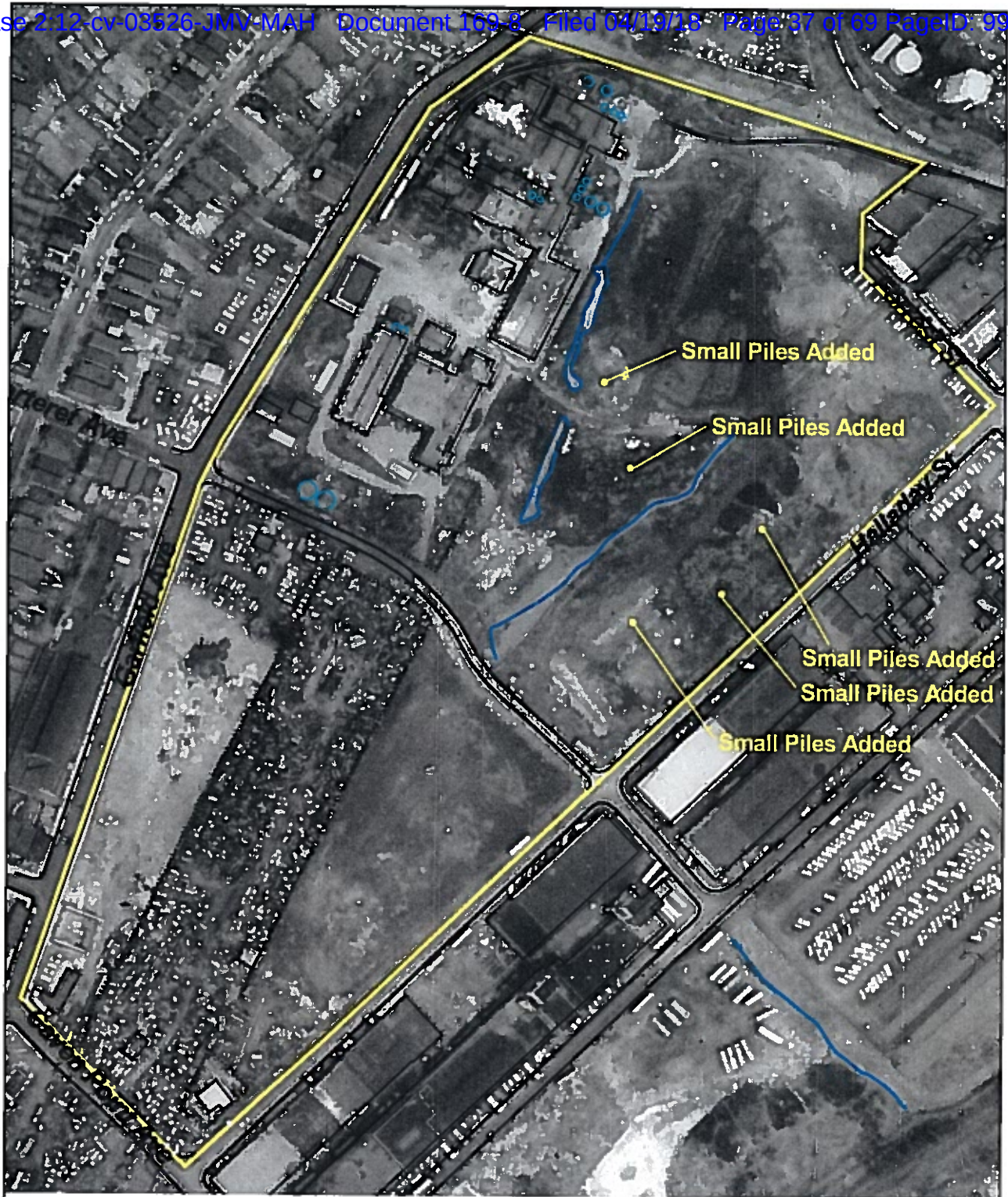
- Legend**
- | | |
|------------------|----------------|
| Pile Area Volume | Road |
| Site Area | Railroad |
| Tanks | Fence |
| Structures | Drainage/Water |

Underlying Image
USNPR0013848

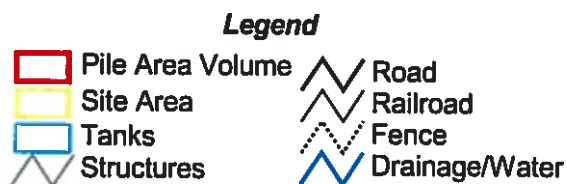


80 0 80 160 Feet





4/12/1961
Jersey City, NJ
Photo Source: TXAERO



Underlying Image
PPGNPR0024487



80 0 80 160 Feet





5/7/1962
Jersey City, NJ
Photo Source: Intrasearch

Legend

- | | | | |
|---|------------------|---|----------------|
|  | Pile Area Volume |  | Road |
|  | Site Area |  | Railroad |
|  | Tanks |  | Fence |
|  | Structures |  | Drainage/Water |

Underlying Image
PPGNPR1060693-976



80 0 80 160 Feet





11/12/1962
Jersey City, NJ
Photo Source: NOS

Legend

- | | |
|--|--|
|  Pile Area Volume |  Road |
|  Site Area |  Railroad |
|  Tanks |  Fence |
|  Structures |  Drainage/Water |

Underlying Image
PPGNPR0047271



80 0 80 160 Feet





1/14/1963
Jersey City, NJ
Photo Source: Robinson

Legend

- | | |
|--|--|
|  Pile Area Volume |  Road |
|  Site Area |  Railroad |
|  Tanks |  Fence |
|  Structures |  Drainage/Water |

Underlying Image
USNPR0013850



80 0 80 160 Feet





6/20/1966
Jersey City, NJ
Photo Source: NOS

Legend
 Site Area

Underlying Image
PPGNPR00448094-112



80 0 80 160 Feet





2007 Imagery
Jersey City, NJ
Photo Source: USGS

Legend

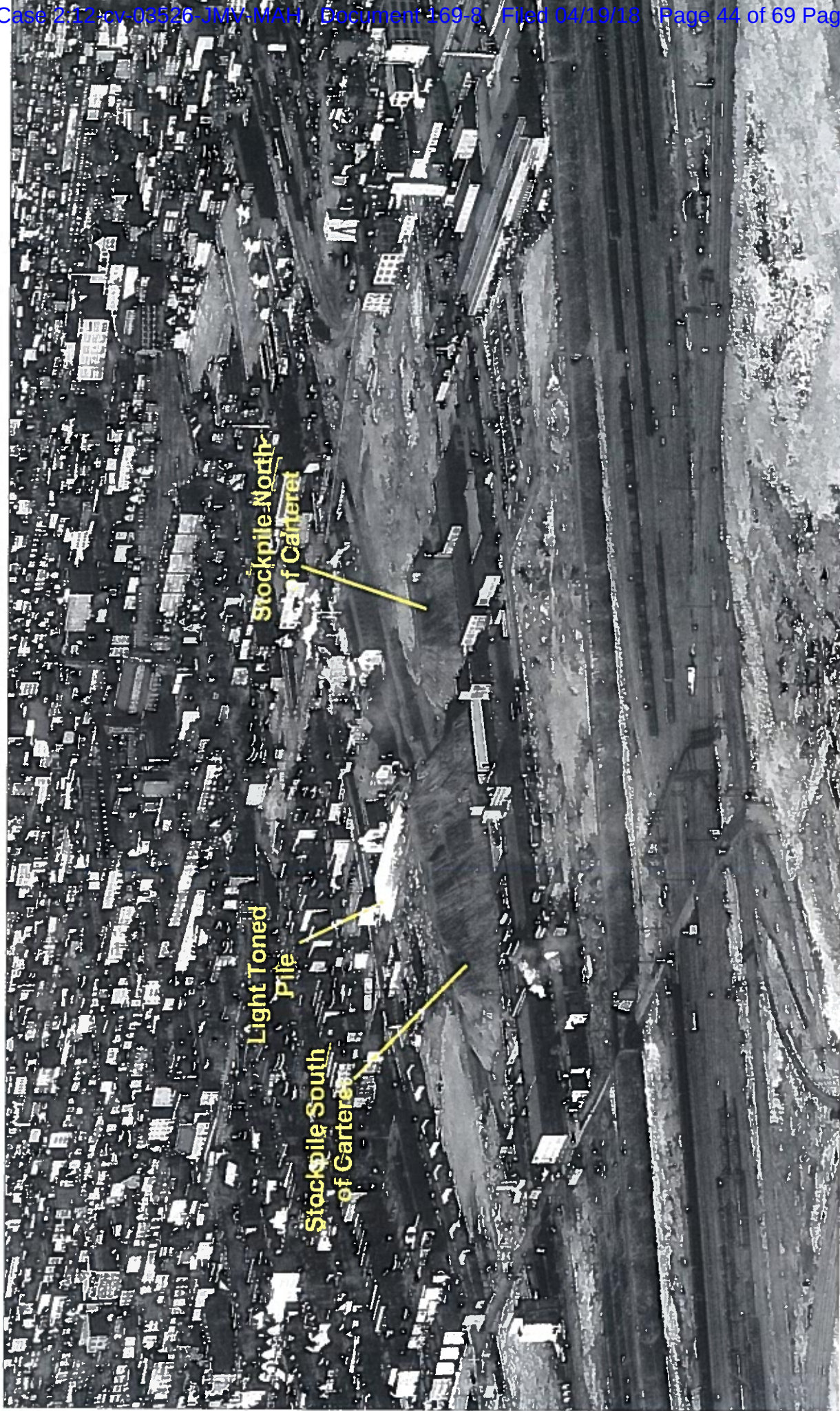
 Site Area



80 0 80 160 Feet

AERO-DATA CORP.
ENVIRONMENTAL
REMOTE SENSING CONSULTING SERVICES
AERIAL PHOTOGRAPHY
INTERPRETATION and MAPPING

Historical Oblique Aerial Photos



Oblique Photograph
102922
Jersey City, NJ
Photo Source: FAIRCHILD

Photo Taken After 4/28/1947

Underlying Image
PPGNPR1028244





Underlying Image
PPGNPR1028245

Photo Taken After 4/28/1947

Oblique Photograph
102931B
Jersey City, NJ
Photo Source: FAIRCHILD



Oblique Photograph
103164
Jersey City, NJ
Photo Source: FAIRCHILD

Underlying Image
PPGNPR1028246



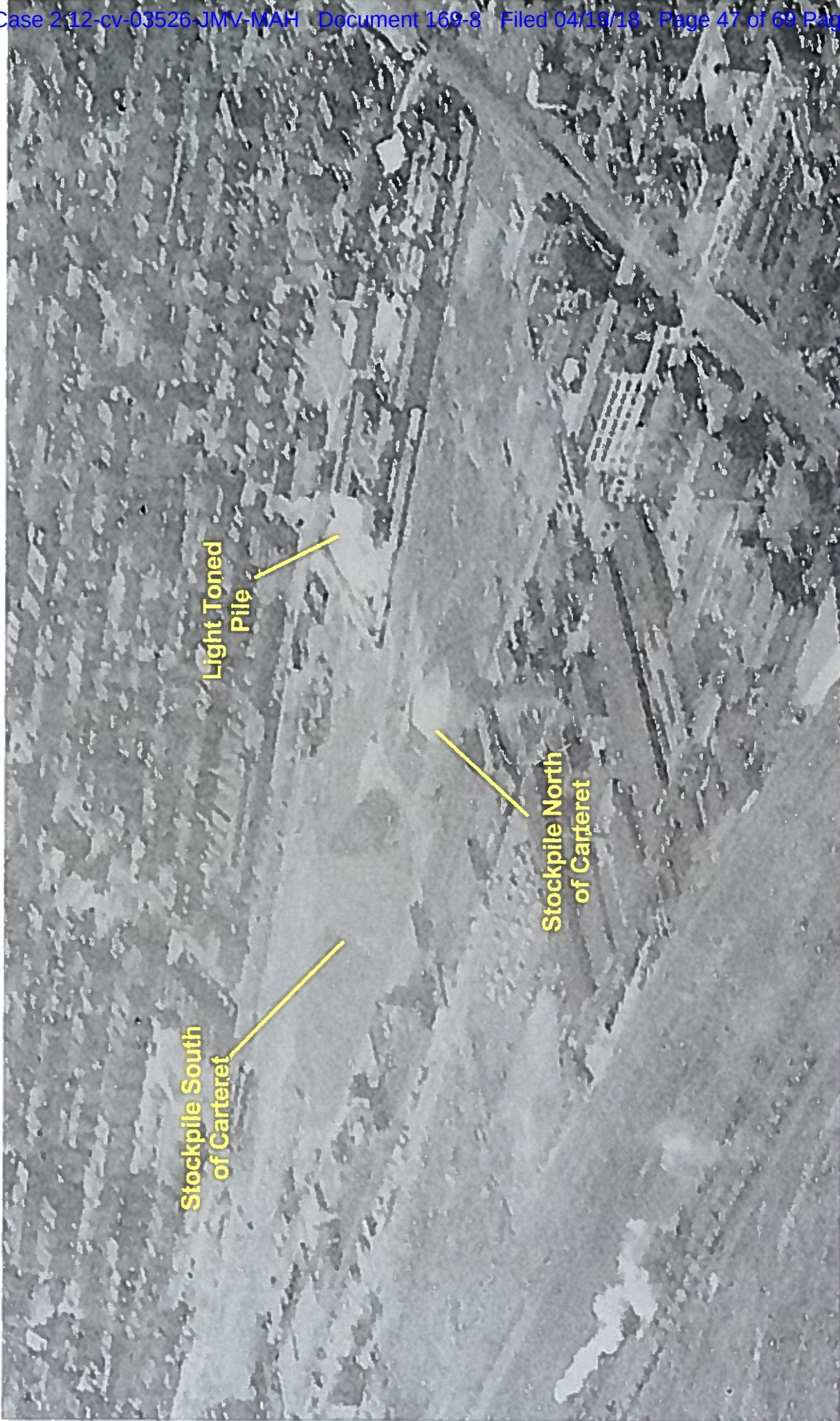
Underlying Image
PPGNPR1028248

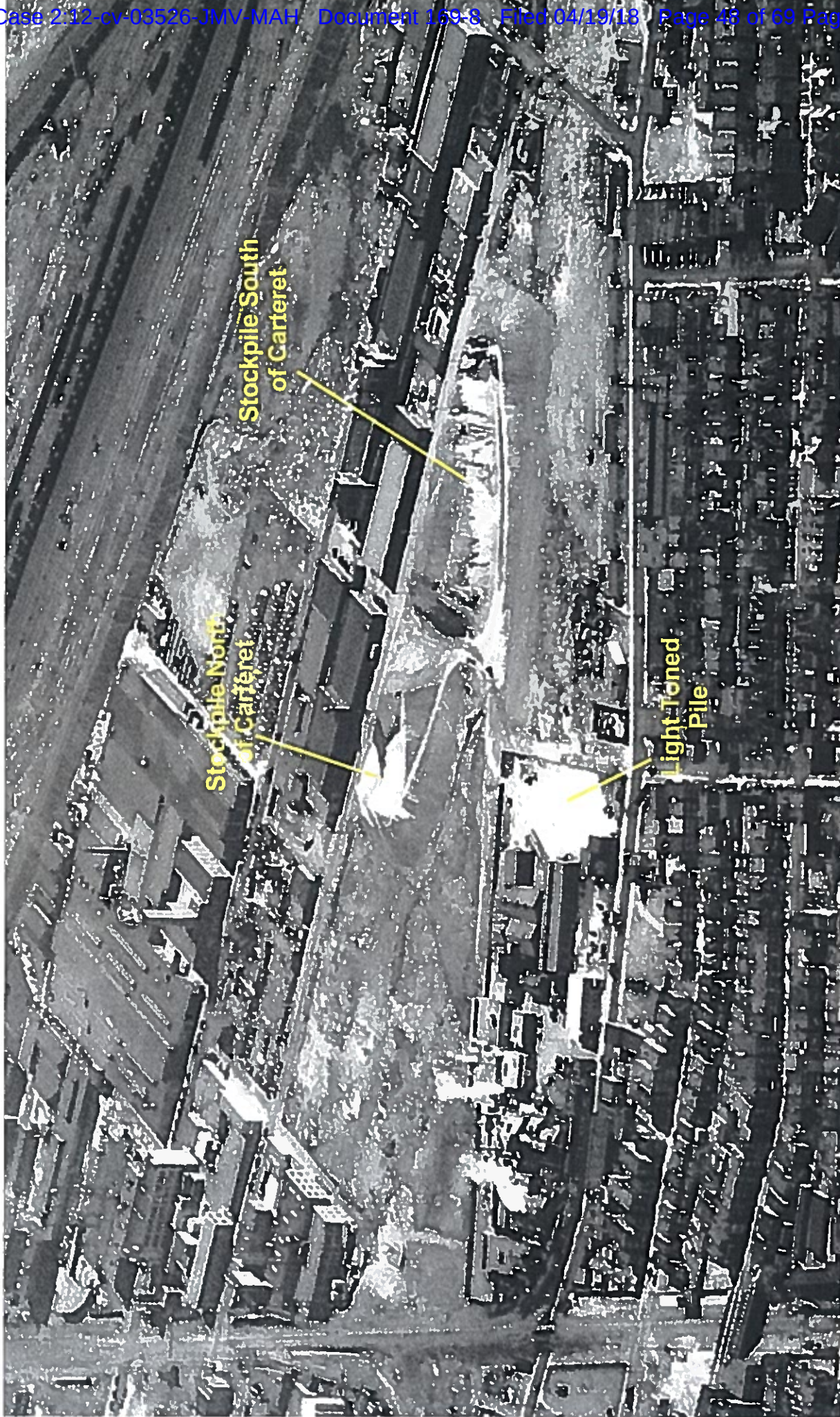
Oblique Photograph
103165
Jersey City, NJ
Photo Source: FAIRCHILD

Stockpile South
of Carteret

Light Toned
Pile

Stockpile North
of Carteret





Oblique Photograph
103173

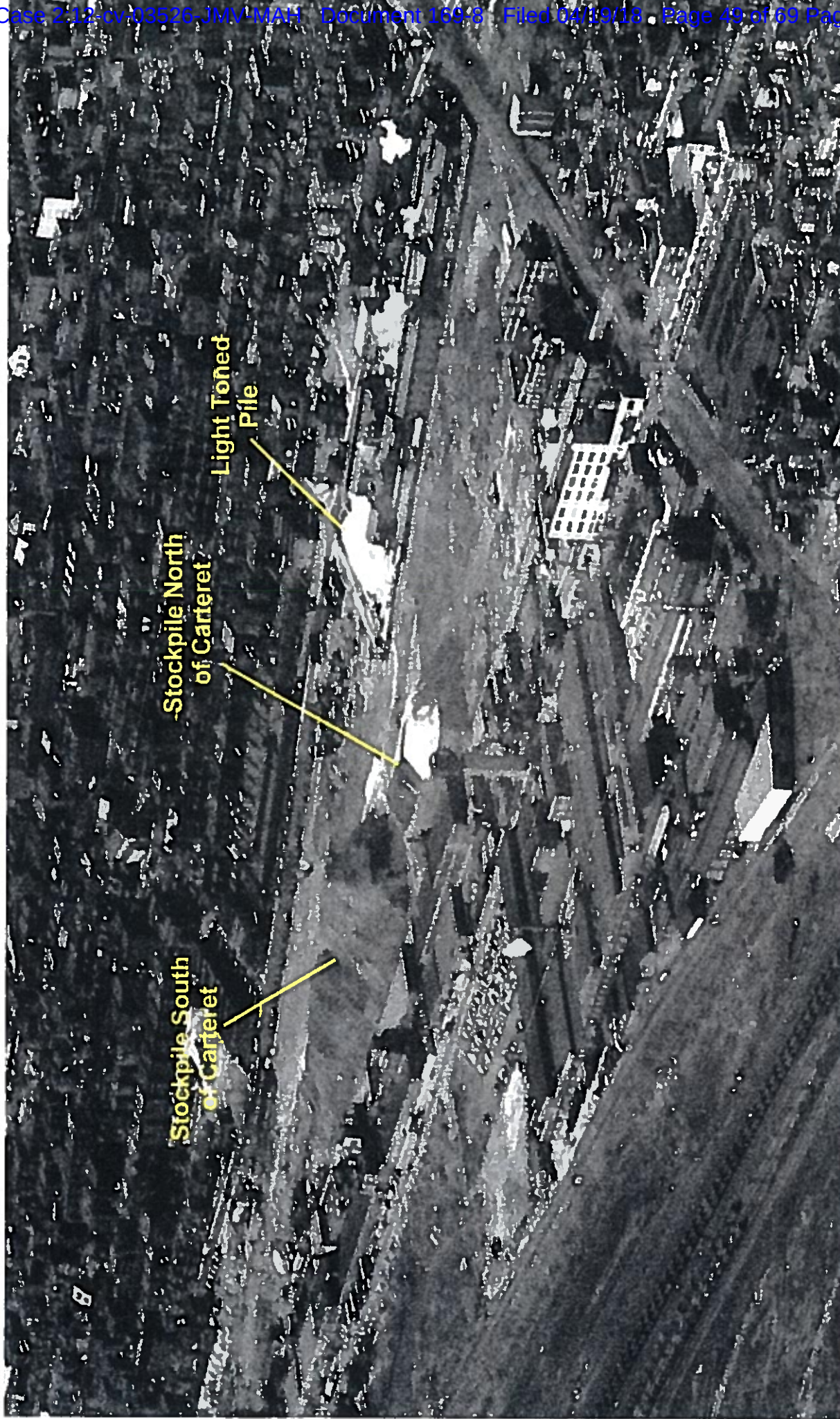
Jersey City, NJ

Photo Source: FAIRCHILD

Photo Taken After 4/28/1947

Underlying Image
PPGNPR1028241





Oblique Photograph
103180B
Jersey City, NJ
Photo Source: FAIRCHILD

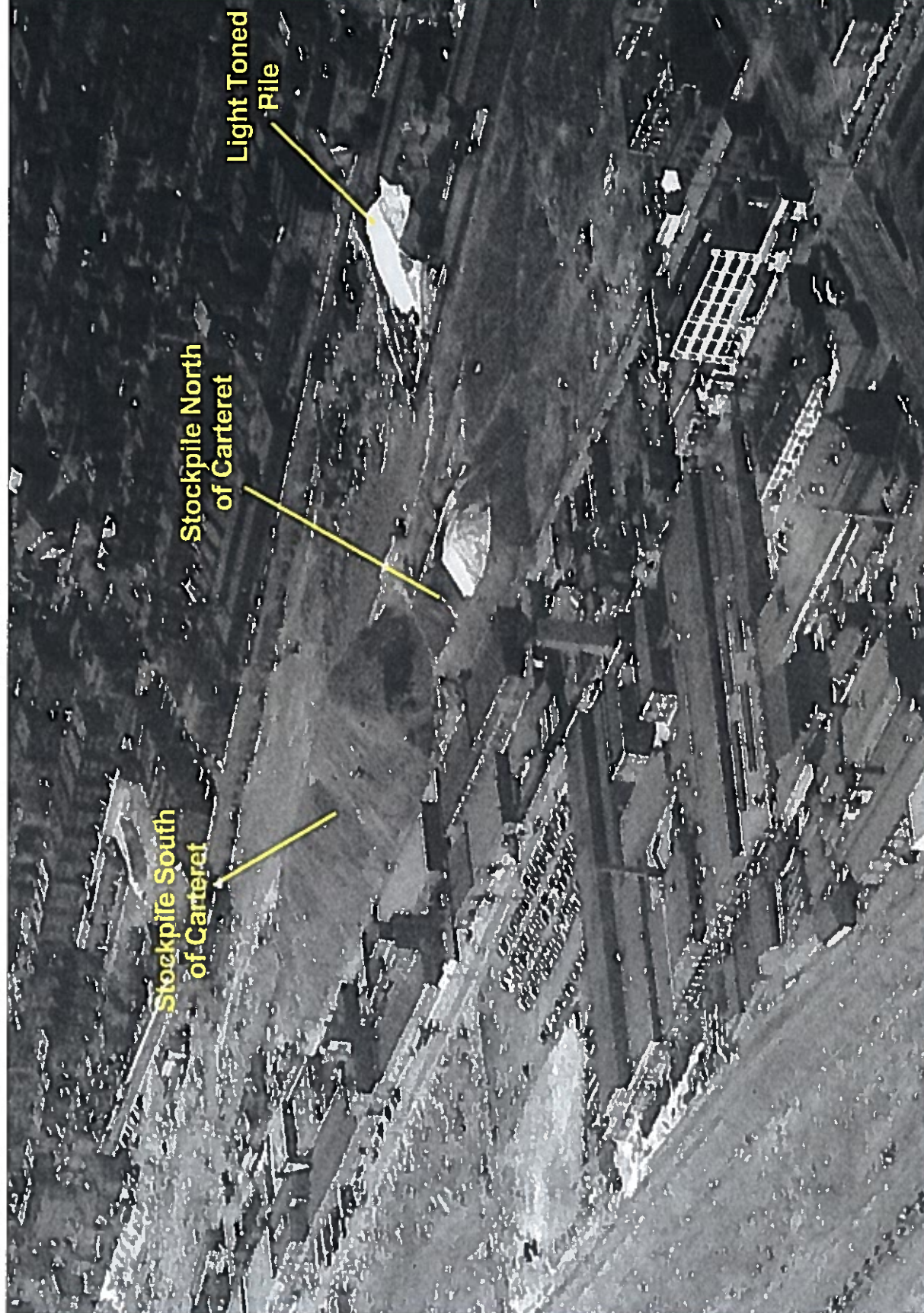
Underlying Image
PPGNPR1028238



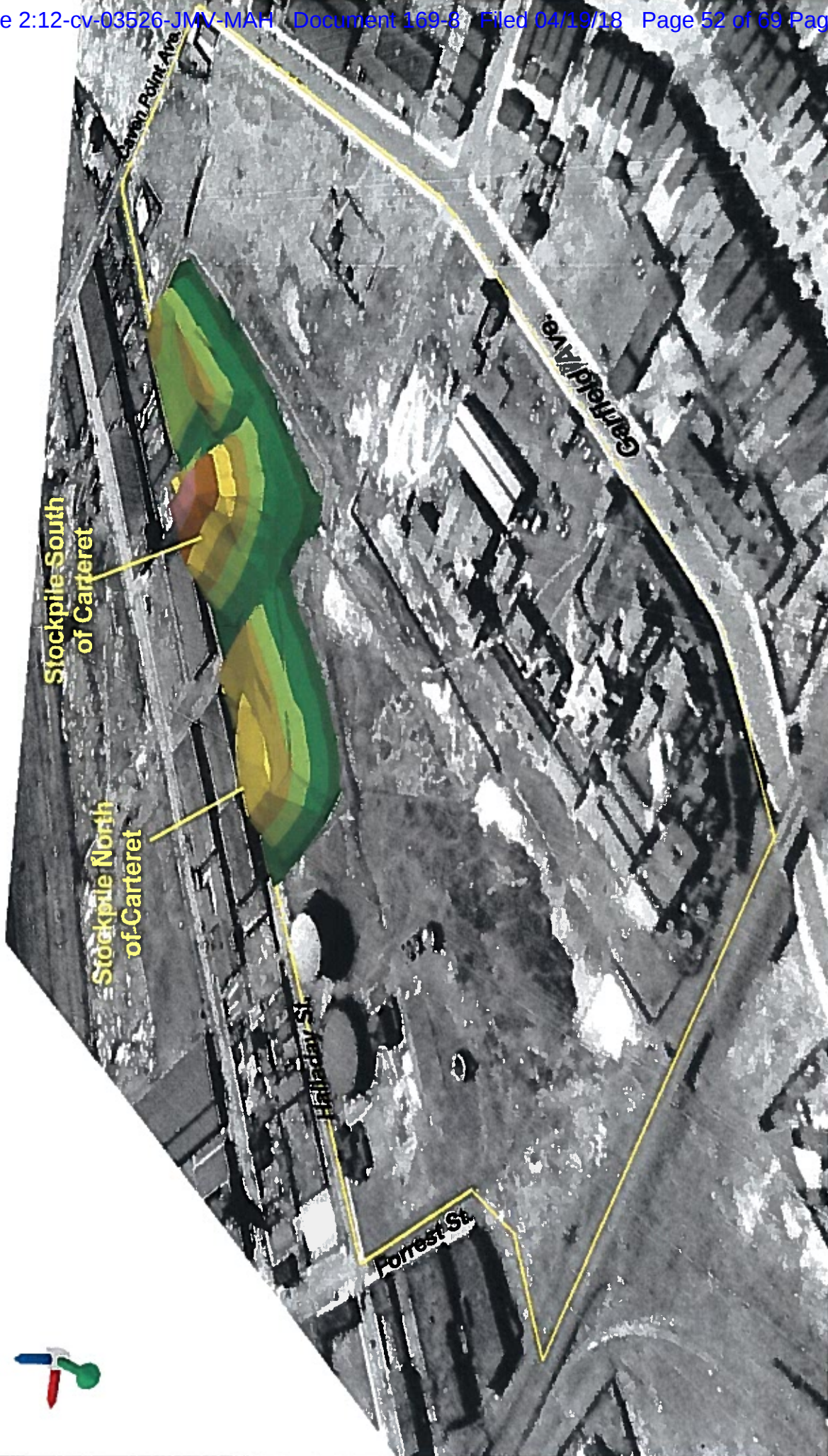


Underlying Image
PPGNPR1028249

Oblique Photograph
103181
Jersey City, NJ
Photo Source: FAIRCHILD



Stockpile Terrain Model Oblique Views



Mapped Terrain Model

4/6/1940

Jersey City, NJ

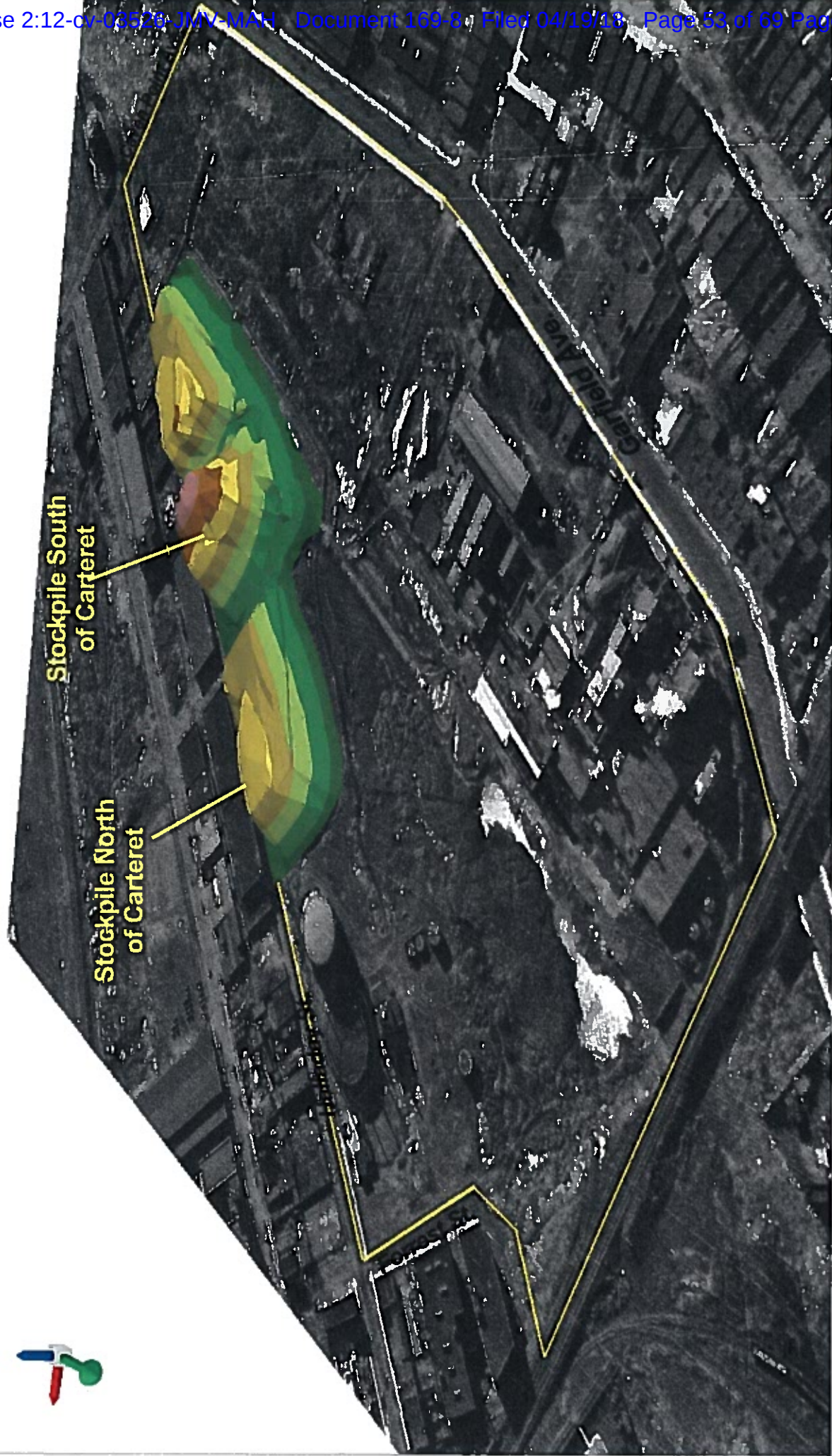
Photo Source: Aerial Viewpoint

Scene is Facing Approximate South



Underlying Image
PPGNPR0024485
PPGNPR0314365-380

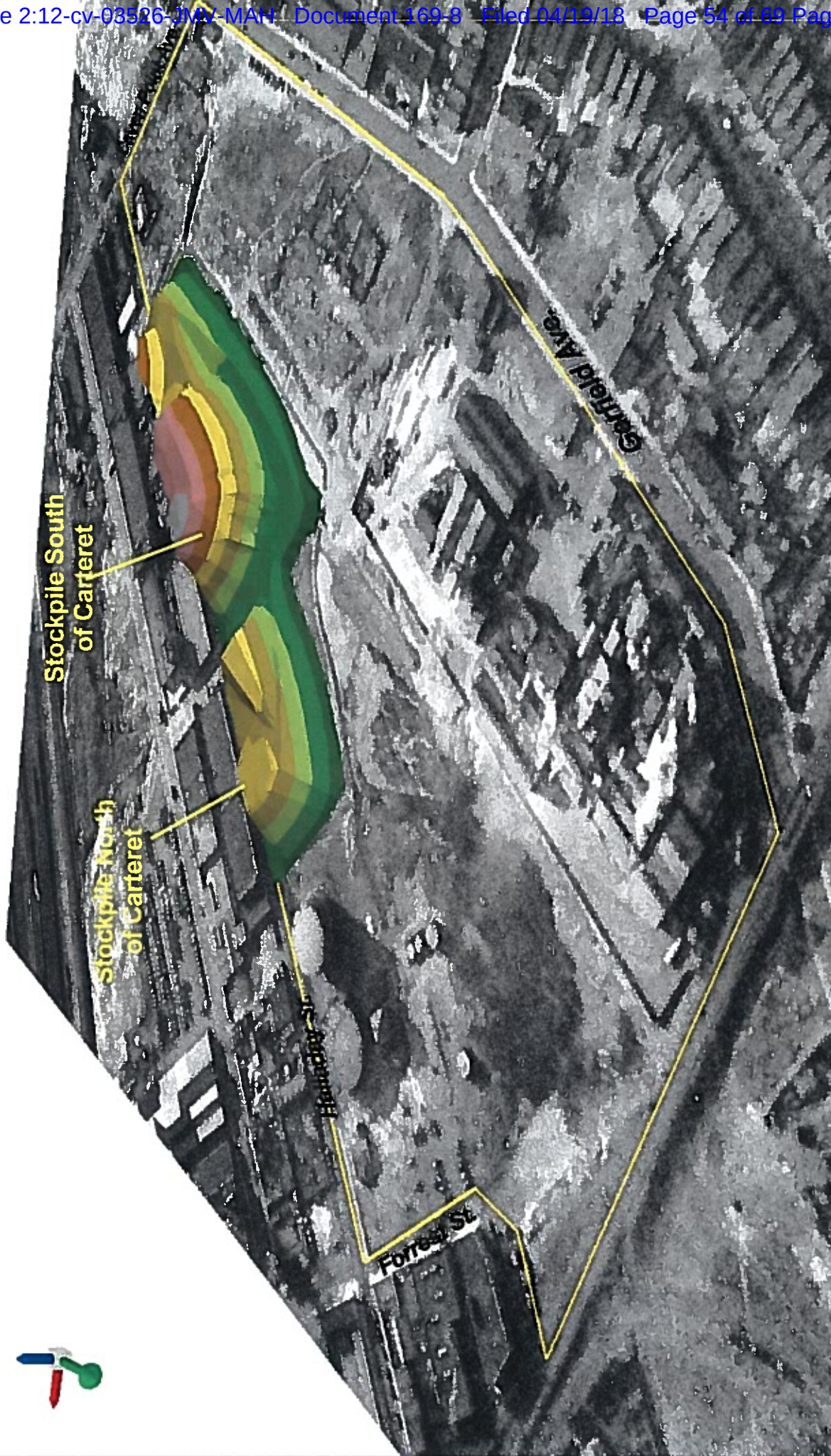




Mapped Terrain Model
11/1/1940
Jersey City, NJ
Photo Source: NARA



Scene is Facing Approximate South
Underlying Image
PPGNPR0314365-380



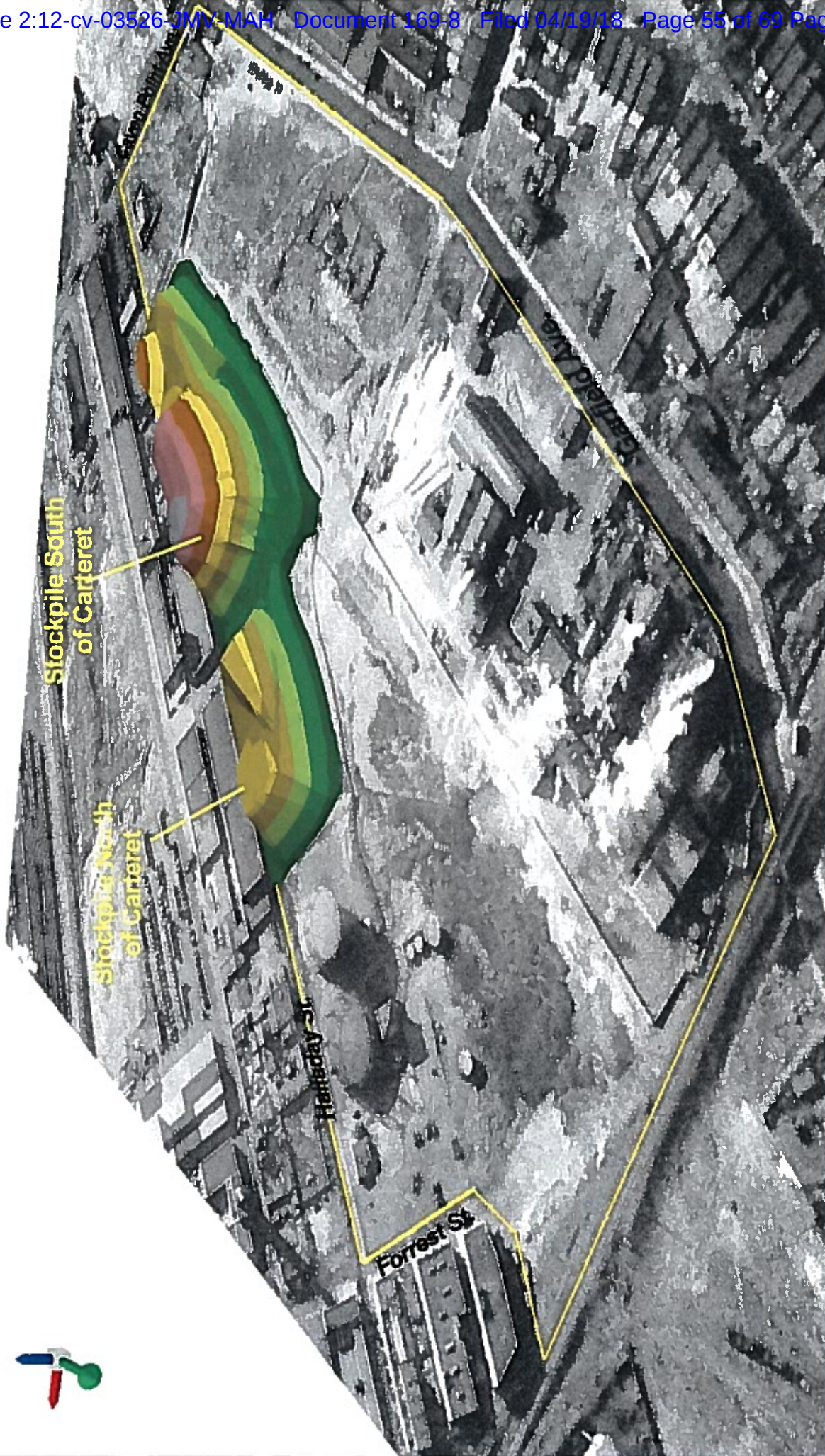
Mapped Terrain Model
12/22/1943
Jersey City, NJ
Photo Source: NOS

Scene is Facing Approximate South



Underlying Image
PPGNPR0048094-112
PPGNPR0782415-432





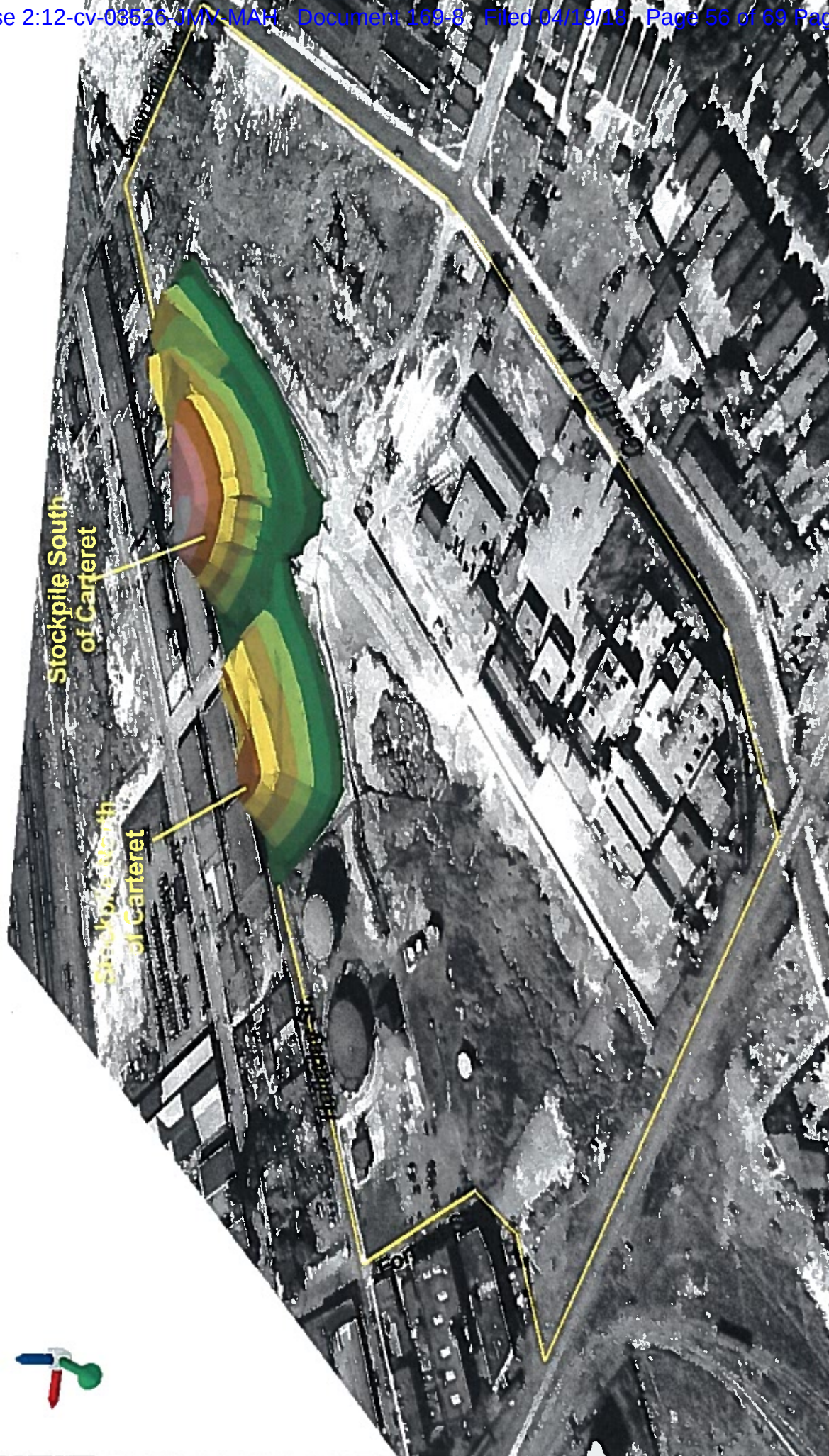
Mapped Terrain Model
12/24/1943
Jersey City, NJ
Photo Source: NOS



Scene is Facing Approximately South

Underlying Image
PPGNPR00448094-112





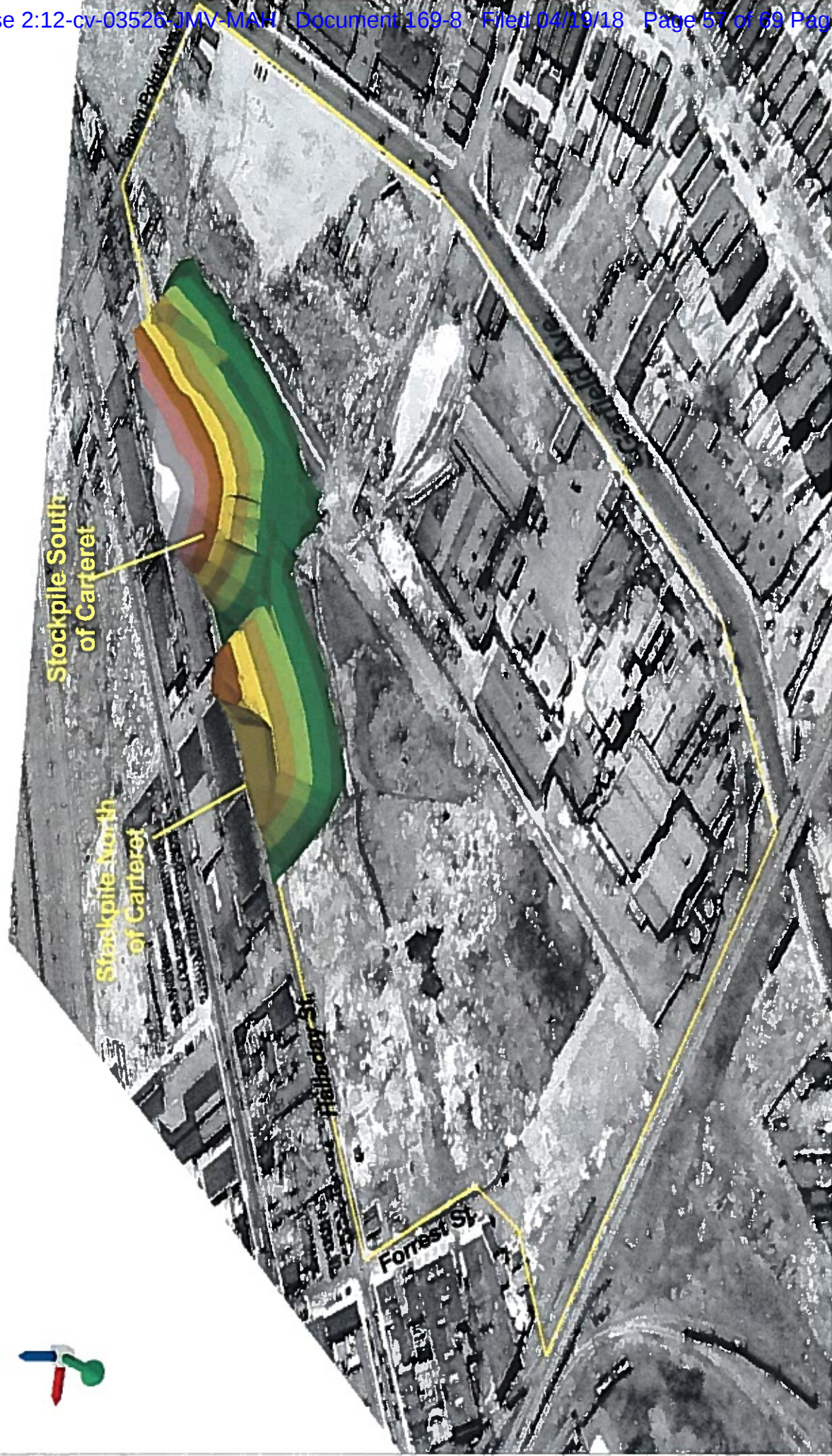
Mapped Terrain Model
7/1/1944
Jersey City, NJ
Photo Source: NARA

Scene is Facing Approximate South



Underlying Image
PPGNPR0048094-112





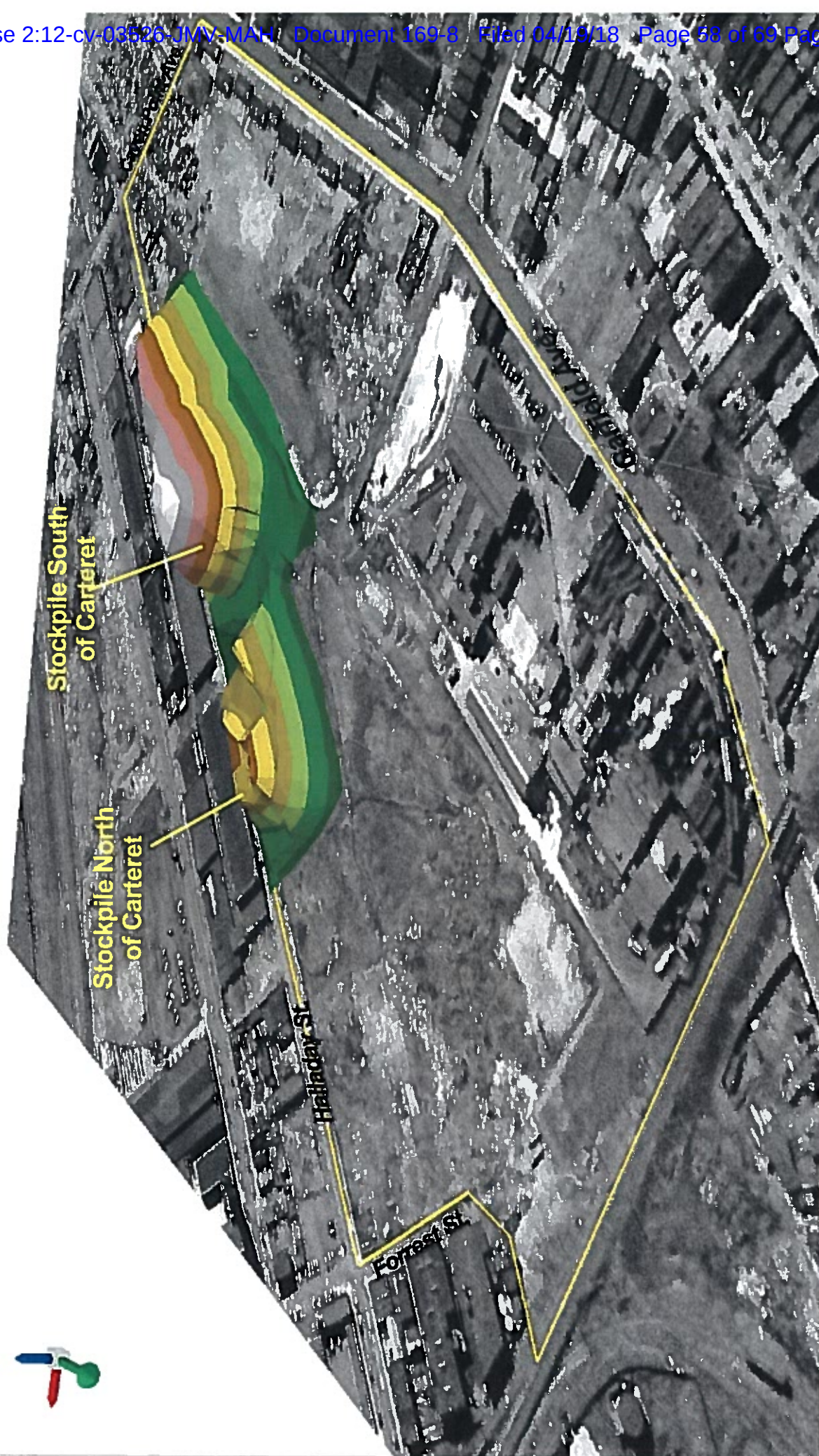
Mapped Terrain Model
4/28/1947
Jersey City, NJ
Photo Source: Robinson



Scene is Facing Approximate South

Underlying Image
USNPR0013843





Mapped Terrain Model

4/7/1951

Jersey City, NJ

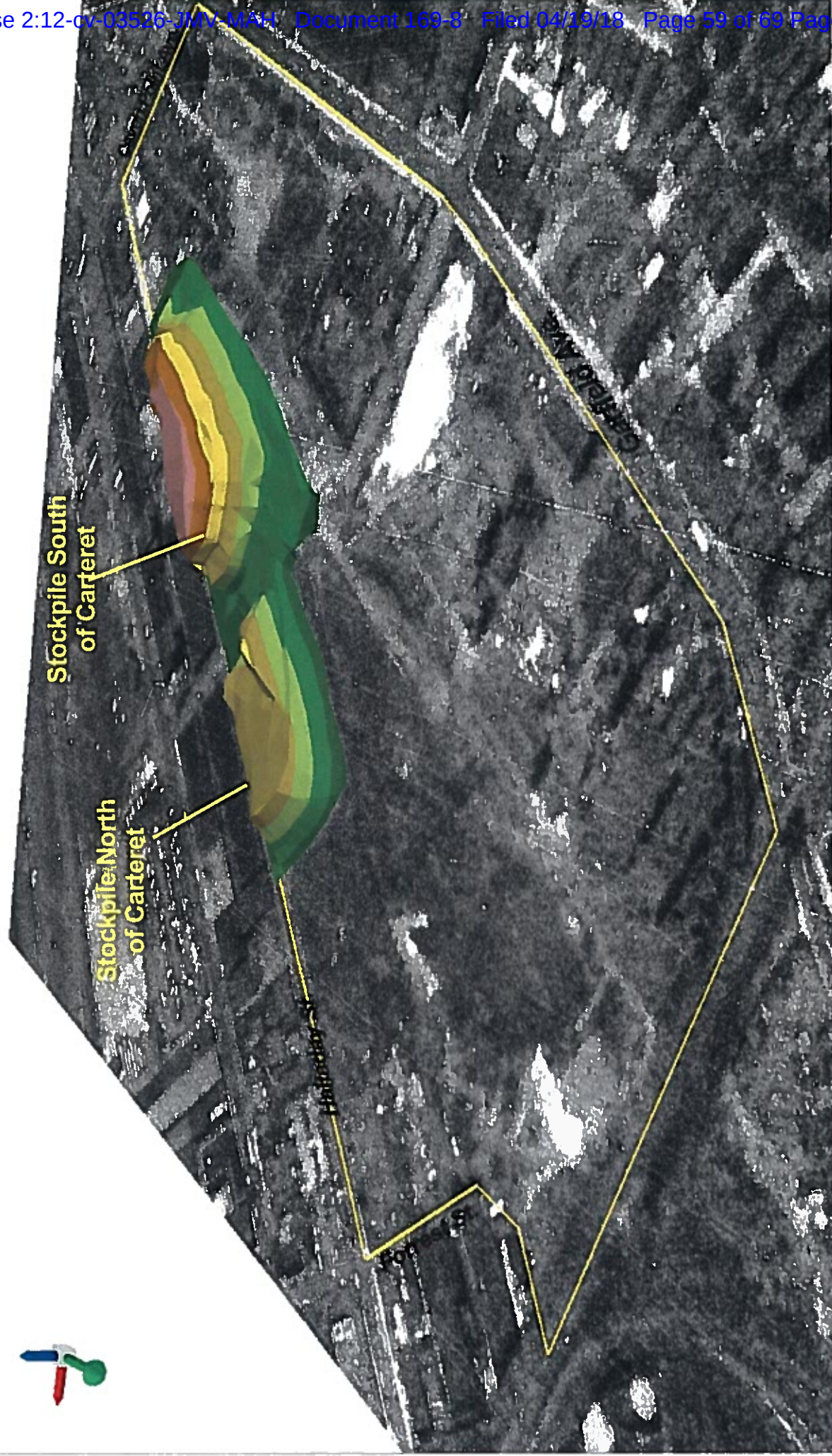
Photo Source: Aerial Viewpoint

Scene is Facing Approximate South



Underlying Image
PPGNPR0024486
PPGNPR0314365-380





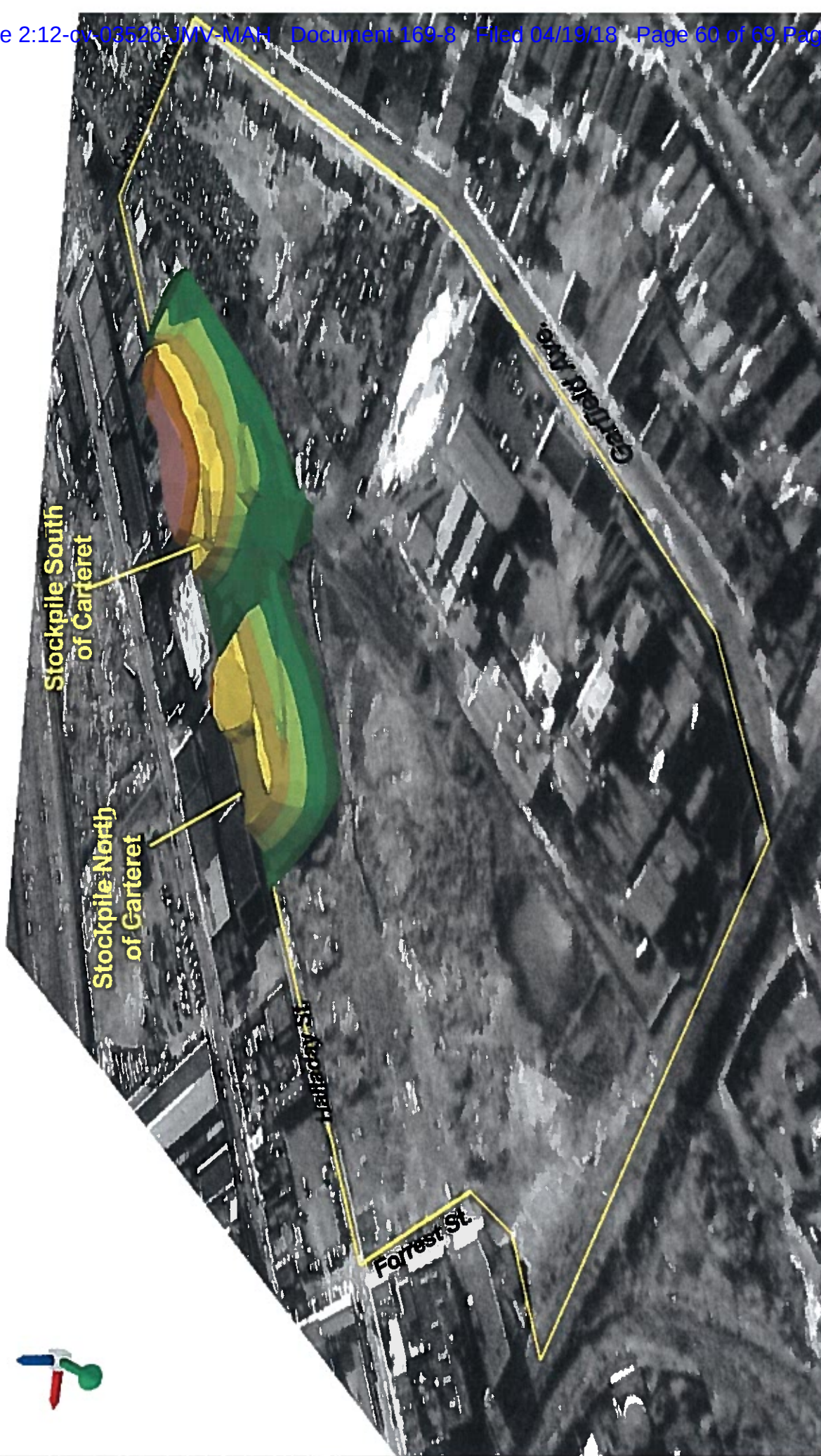
Mapped Terrain Model
6/8/1953
Jersey City, NJ
Photo Source: NARA

Scene is Facing Approximate South



Underlying Image
PPGNPR1060693-976





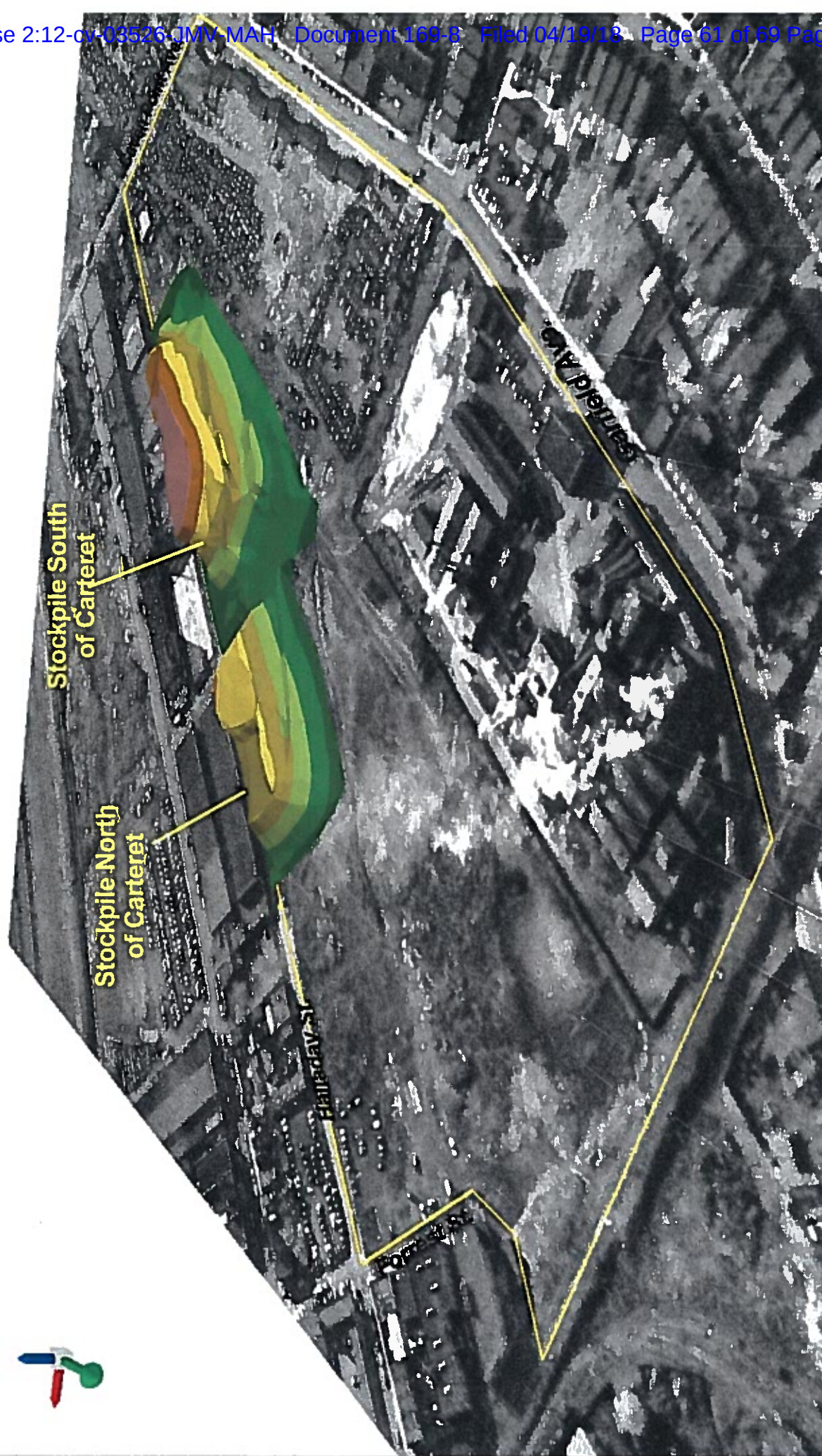
Mapped Terrain Model
12/5/1953
Jersey City, NJ
Photo Source: Intrasearch

Scene is Facing Approximate South



Underlying Image
PPGNPR1060893-976
PPGNPR00448094-112





Mapped Terrain Model

1/4/1954

Jersey City, NJ

Photo Source: USGS

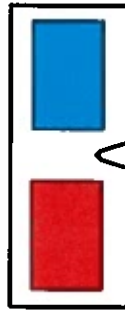
Scene is Facing Approximate South

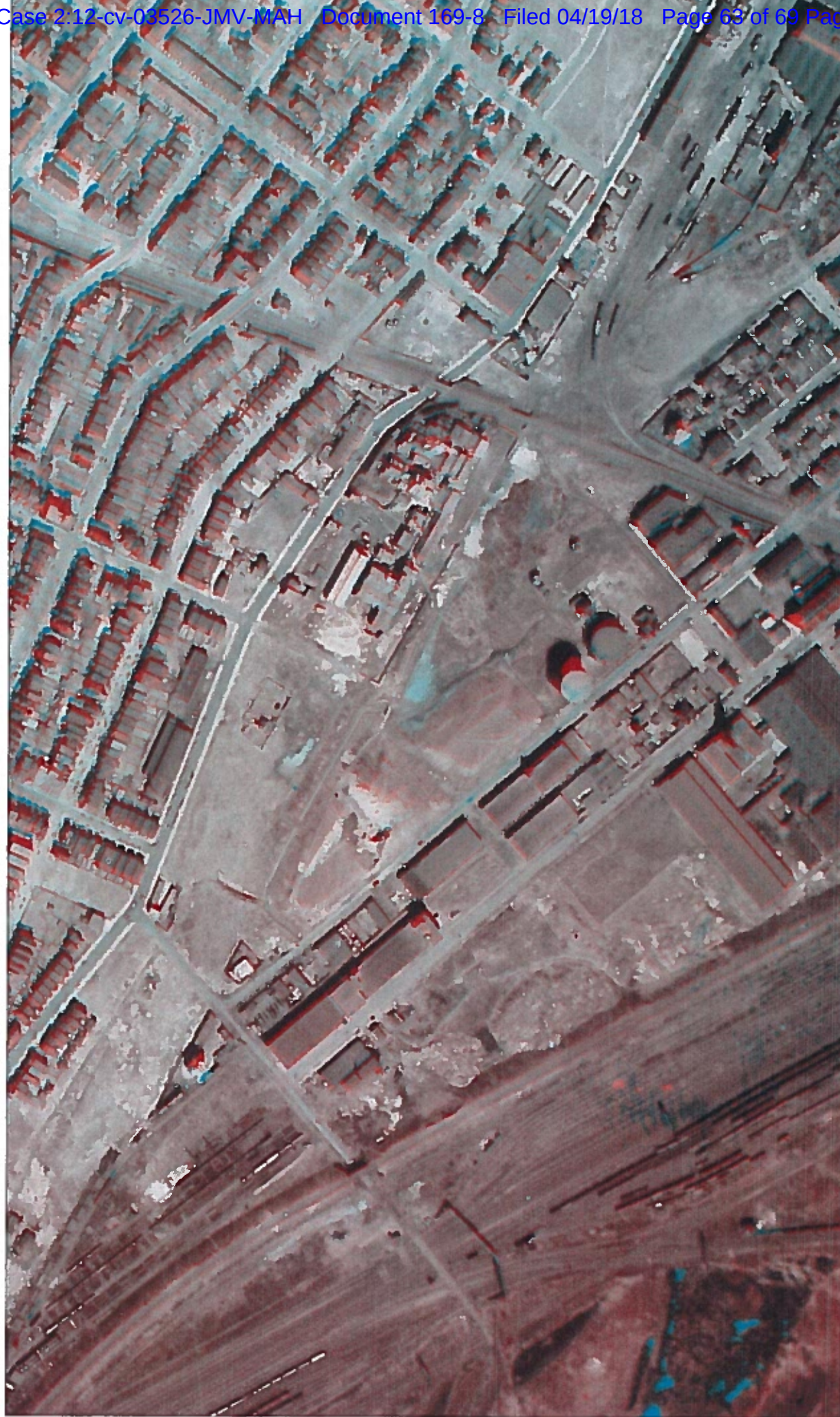


Underlying Image
USNPR0013846



Anaglyph 3-D Images





3-D Image
4/6/1940
Jersey City, NJ
Photo Source: TXAERO

Use Glasses for
Stereo Viewing



Approximate Scale and North Arrow

Underlying Image
PPGNPR0024485
PPGNPR0314365-380





3-D Image
11/1/1940
Jersey City, NJ
Photo Source: NARA

Use Glasses for
Stereo Viewing

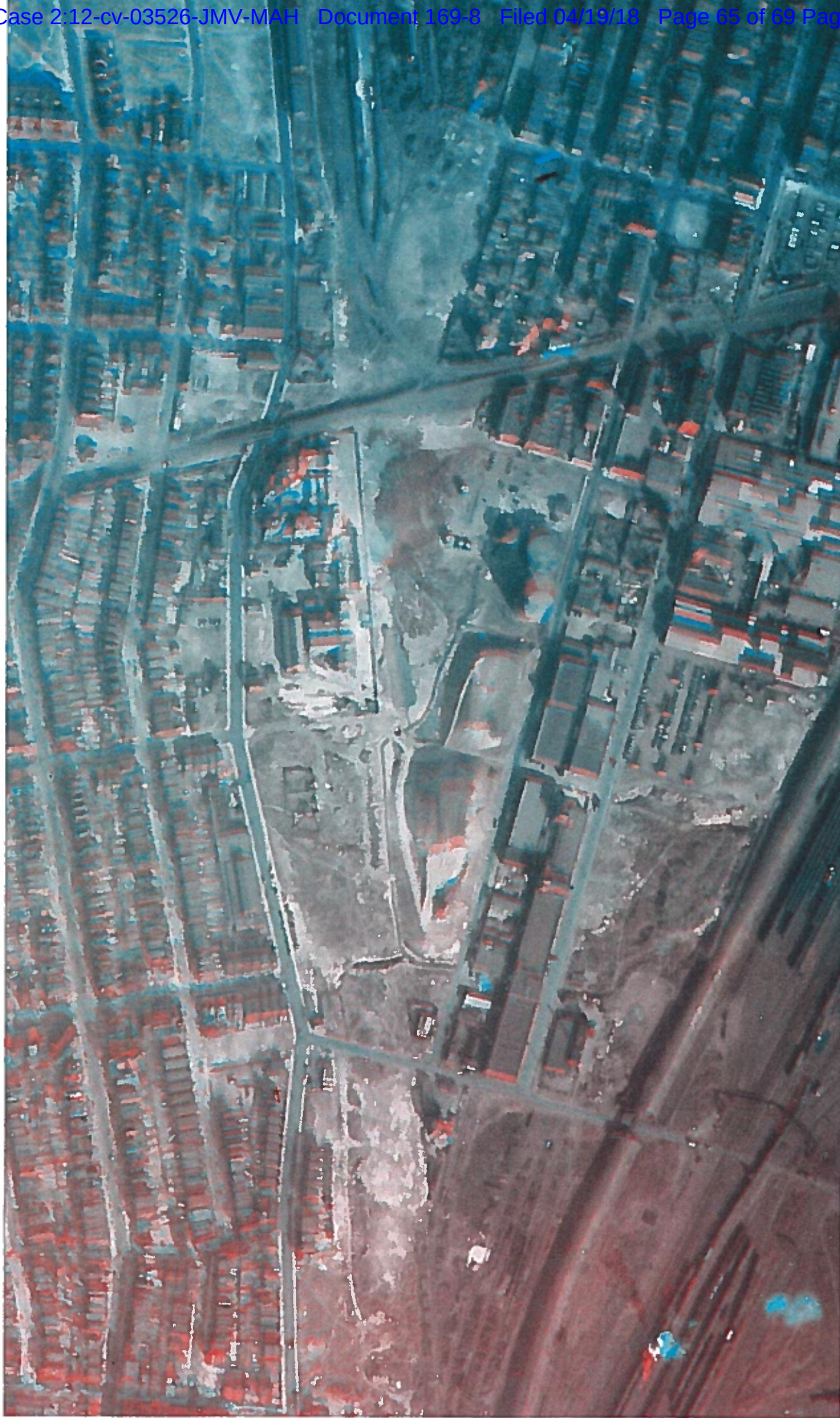


100 0 100 200 Feet

Approximate Scale and North Arrow

Underlying Image
PPGNPR0314365-380

AERO-DATA CORP.
AERIAL PHOTOGRAPHY
SERVICES
10000 W. 10TH AVE.
DENVER, CO 80202



3-D Image
12/22/1943
Jersey City, NJ
Photo Source: NOS

 Use Glasses for
Stereo Viewing

 N
100 0 100 200 Feet
Approximate Scale and North Arrow

Underlying Image
PPGNPR0048094-112
PPGNPR0792415-432

 AERO-DATA CORP.
AERIAL PHOTOGRAPHY
SERVICES
10000 WILSON AVENUE
SUITE 100
CHICAGO, ILLINOIS 60658
TEL: (773) 344-0000
FAX: (773) 344-0001
WWW.AERODATACORP.COM



3-D Image
12/24/1943
Jersey City, NJ
Photo Source: NOS

 Use Glasses for
Stereo Viewing



100 0 100 200 Feet

Approximate Scale and North Arrow

Underlying Image
PPGNPR00448094-112

 AERO-DATA CORP.
AERIAL PHOTOGRAPHY
SERVICES
10000 WILSON AVENUE
SUITE 200
BETHESDA, MD 20814
TEL: (301) 915-1100
FAX: (301) 915-1101



3-D Image
7/1/1944
Jersey City, NJ
Photo Source: NARA

Use Glasses for
Stereo Viewing



100 0 100 200 Feet

Approximate Scale and North Arrow

Underlying Image
PPGNPR00448094-112



Underlying Image
USNPR0013843

100 0 100 200 Feet



Approximate Scale and North Arrow



Use Glasses for
Stereo Viewing

3-D Image
4/28/1947
Jersey City, NJ
Photo Source: ROBINSON





3-D Image
4/7/1951
Jersey City, NJ
Photo Source: TXAERO



Use Glasses for
Stereo Viewing



100 0 100 200 Feet

Approximate Scale and North Arrow

Underlying Image
PPGNPR0024486
PPGNPR0314365-380

